PERKIN CENTENNIAL ISSUE
AMERICAN
DYESTUFF REPORTER

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The Perkin Centennial

Sponsored by the

American Association of Textile Chemists and Colorists

The Waldorf-Astoria, New York, N Y • Week of September 10th, 1956

PARTICIPATING SOCIETIES

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

AMERICAN CHEMICAL SOCIETY

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

THE AMERICAN LEATHER CHEMISTS ASSOCIATION

AMERICAN PHARMACEUTICAL ASSOCIATION

AMERICAN PSYCHOLOGICAL ASSOCIATION

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TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY

TEXTILE RESEARCH INSTITUTE

—ALSO COOPERATING GOVERNMENT DEPARTMENTS

FOREWORD

During the year 1956, the entire chemical world is paying tribute to an inventive genius in the field of science—William Henry Perkin. His research-conscious mind was responsible for creating the first synthetic dye—mauve—quite by accident, just 100 years ago, in an attempt to synthesize quinine. This new material had the power to dye silk and wool, and, realizing its potentialities, Perkin had the foresight to patent his process and established the first factory in the world for the manufacture of dyes.

Perkin's discovery was in the nature of a catalyst that was the motivating factor in establishing a new industry—one that has been developed into a key industry not only because of its relation to national security but of equal importance to a nationally balanced manufacturing system. The industry has given employment to thousands, it has stimulated interest in the adoption of the many phases of science and engineering as a career, and brought about the development of innumerable new products that have contributed greatly to what we call "our modern way of life".

The Centennial of Perkin's discovery will be climaxed by a celebration during the week of September 10, 1956, at the Waldorf-Astoria Hotel, New York. Sponsored by the American Association of Textile Chemists and Colorists, the event is considered to be of such significance to leading technical, chemical and scientific societies, associated with the production, application and merchandising of color, that twenty-seven such organizations and two departments of the U S Government are participating in the occasion. This is particularly noteworthy because it is the first time that such a large group of distinguished professional societies has assembled with one purpose in mind.

GREETINGS

From the President and Vice Presidents American Association of Textile Chemists and Colorists

RAYMOND W JACOBY
(Ciba Co, Inc)
President

ERNEST R KASWELL
(Fabric Research Labs, Inc)
Vice President
New England Region

FREDERICK V TRAUT
(Globe Dye Works Co)
Vice President
Central Atlantic Region

WALTER M SCOTT
(U S Dept of Agriculture)
Vice President
Southern Region

JOSEPH H JONES
(Phoenix Dye Works)
Vice President
Western Region

WHEN the Council of the AATCC voted at its meeting in April, 1953, to sponsor a Perkin Centennial in 1956, it embarked upon a project, the magnitude and scope of which had never been undertaken before. While Perkin, with his vision and genius, was the first person to engage in the commercial production of a synthetic dye, the outgrowth of developments arising therefrom spread into many fields in the century which followed. Today there are thousands of industrial organizations and hundreds of thousands of individuals engaged in activities which owe their existence to these developments.

In observing this anniversary we are not simply paying tribute to one important event, rather we are making acknowledgment of a cornerstone from which grew a commercial empire whose varied products and processes affect the life of every individual.

For this reason, twenty-seven of the leading professional societies and two branches of the U S Government are engaging in this cooperative program of recognition.

The various features of the Perkin Centennial will cover the entire week of September 10. The participating societies have a total membership of over 200,000 individuals and over 3,000 companies.

The topics will cover the many areas in which the different societies function. The papers to be presented will be the contributions of the leaders in their field. Never before has there been an assembly of such an outstanding group of professional people united in a mutual effort.

The presidents of the participating societies have written letters which indicate how the outgrowths of Perkin's discovery affect the fields in which their members serve. They are most inspiring and will be published in the Book of Proceedings of the Perkin Centennial, which will go to each registrant.

The AATCC is fortunate in that there are within its ranks men of ability and energy who contributed generously of their talents to make previous conventions a success. With this background of experience the Association dared to assume the responsibility of sponsoring this Perkin Centennial. These men rose to the occasion and, with the assistance of members of the participating societies, have converted the hopes and plans into realities.

It is a privilege and an honor to extend greetings to you on this occasion. When you attend the Perkin Centennial you will be proud that so many people labored long and hard to serve you well. Great satisfaction will come to all of you who say—

SEE YOU AT THE WALDORF

RAYMOND W JACOBY
President, AATCC

GREETINGS FROM THE NEW ENGLAND REGION

ON this happy occasion of the celebration of the Perkin Centennial, I send greetings to all from the New England Region of the AATCC.

We live in a better world because of the contributions made by William Henry Perkin and his contemporaries. The past one hundred years has seen the fruition of the organic chemical industry; truly we live in a chemical age.

In addition to mauve, Perkin in his lifetime synthesized a large number of compounds, including glycocoll, tartaric acid, coumarin, cinnamic acid, polymethylene rings, ethyl benzoyl acetate, anthraquinone, indene, and camphor. His direct and indirect contributions to the dyestuffs and textile chemical industries warrant the recognition and commemoration of this famous scientist.

May we all be inspired by the work of Perkin and the other men of the Nineteenth Century who gave so much to the world in the arts, literature, music, medicine, and science!

ERNEST R KASWELL
Vice President (New England Region)

GREETINGS FROM THE CENTRAL ATLANTIC REGION

WITH the Perkin Centennial almost upon us, it is my hope that the Central Atlantic Region will be well represented.

The Perkin Centennial enables all of us to pay tribute to an inventive genius in the field of science, William Henry Perkin. We all are familiar with the impact of Perkin's discovery on our living and our industry.

Your attendance will enable you to graphically see and obtain your personal "Key to the Rainbow," which will unlock the door to "A More Colorful World."

I hope to see you there.

FRED V TRAUT
Vice President (Central Atlantic Region)

GREETINGS FROM THE SOUTHERN REGION

I AM sure that the AATCC members in the Southern Region recognize the extreme importance of the Perkin Centennial, which is sponsored by our Association. The combination of our annual meeting with the week-long centennial activities in which over 25 other societies and associations are participating presents an unparalleled opportunity and a challenge to our own members. There is the opportunity to hear many noted speakers both from this country and from Europe, and there is the challenge to support our president in his efforts to make this Centennial a great success. Let the Southern Region be foremost in the percentage of its members who come to New York in September.

WALTER M SCOTT
Vice President (Southern Region)

GREETINGS FROM THE WESTERN RGION

MANY of our individual and corporate members plan to attend the Perkin Centennial in New York as they fully realize what is to be gained by personal representation. The wealth of material to be presented in the papers of the various participating societies, the exhibits and the AATCC features all make it worth while for us to be there. In addition, the opportunity to meet new people in our own industry from other sections of the country and to renew old friendships will contribute to the value of this event. Even though the Western Region is the most remote from New York we say

"See you at the Centennial!"

JOSEPH H JONES
Vice President (Western Region)

GREETINGS FROM PARTICIPATING SOCIETIES

American Association
for the Advancement of Science

CONSERVATION PROGRAM, YALE UNIVERSITY, NEW HAVEN, CONNECTICUT

OFFICE OF THE PRESIDENT

August 27, 1956

On behalf of more than 200 affiliated societies and some 50,000 individual members of the American Association for the Advancement of Science, it is my privilege to extend greetings to the American Association of Textile Chemists and Colorists and to express gratitude to your journal for its efforts to commemorate an anniversary significant to all of modern science.

Sincerely yours,

Paul B. Sears

Paul B. Sears
President

PBS:es

AMERICAN CHEMICAL SOCIETY
OFFICE OF THE PRESIDENT

J. C. WARNER
PRESIDENT

CARNEGIE INSTITUTE OF TECHNOLOGY
PITTSBURGH 13, PENNSYLVANIA

July 13, 1956

Gentlemen:

The Perkin Centennial Celebration is a significant occasion to all chemists. I wish, on behalf of the officers and more than seventy-seven thousand members of the American Chemical Society, to extend greetings to the American Association of Textile Chemists and Colorists as they commemorate the life and scientific achievements of a great man — Sir William Henry Perkin.

Sincerely,

J. C. Warner

J. C. Warner

The American Association of
Textile Chemists and Colorists
44 East 23rd Street
New York 10, New York

THE AMERICAN LEATHER CHEMISTS Association

FOUNDED 1903

PLEASE ADDRESS REPLY TO

August 27, 1956

American Association of
Textile Chemists and Colorists
44 East 23rd Street
New York 10, New York

Gentlemen:

The American Leather Chemists Association is honored and pleased to be able to participate in the Centennial celebration of the discovery of Aniline dyes by Sir William Henry Perkin. It is my privilege as President of the American Leather Chemists Association to extend greetings to all participants and visitors on behalf of our membership. The discovery of Aniline dyes has added much to the product of our industry and has helped to make it the distinctive and desired product that it is today.

Yours very sincerely,

President, A.L.C.A.

EBT:es

AMERICAN PSYCHOLOGICAL ASSOCIATION

1333 Sixteenth Street, N. W.
Washington 6, D. C.

OFFICE OF THE PRESIDENT

August 27, 1956

The commemoration of William Henry Perkin and of other contributors to "a more colorful world" should draw many tributes from diverse fields of science and of other areas of human endeavor. The revolution in color which followed the "breakthrough" of knowledge and technique in aniline dyes is a remarkable illustration of the inter-relatedness of research, technology, and constant change and evolution in cultural patterns.

A century ago a great discovery was made by accident. Today a President of the United States and his constituents think nothing of his wearing a colorful sports-shirt in his off-duty hours, a riot of color which would have startled the Founding Fathers as much as Indian war-paint. The average man today expects to have color photographs made of his wedding; the happy couple expect to live in a house of many colors, their children expect to learn the news of the world through color television in their living room. The story of William Henry Perkin and of the anilines hold many lessons for those who, like the psychologists who study human behavior, are interested in understanding the world as man finds it and as man makes it.

When men's use of applied science in so many directions makes the future look black, it is pleasant and useful to pause and review some of the benefits to humanity flowing from the synthetic production of mauve. Today we need to remember the black but should also commemorate happy gifts from technology, if we are to see our possible future in all its true colors.

Congratulations, therefore, on your Centennial.

Sincerely yours,

Theodore M. Newcomb
President

TMN:ws

AMERICAN INSTITUTE OF PHARMACY

HEADQUARTERS OF

American Pharmaceutical Association

ORGANIZED 1852

OFFICE OF THE PRESIDENT

August 27, 1956

The American Pharmaceutical Association is happy to join other participating societies in extending to the American Association of Textile Chemists and Colorists its greetings and best wishes on the occasion of the Perkin Centennial.

It was a happy thought which motivated the Association to sponsor this commemoration of the Centennial of William Henry Perkin's momentous discovery which has been responsible for the development of so many new products contributing greatly to the well-being of the human race.

May we extend our congratulations to those who have conceived and executed this tribute to a brilliant chemist and to the industries which have made use of his discoveries in the promotion of the health, comfort and welfare of people all over the world.

Cordially,

John A. MacCartney
President

AMERICAN SECTION
OF THE
SOCIETE DE CHIMIE INDUSTRIELLE, INC.

330 WEST 42ND STREET - ROOM 1300
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TELEPHONE: LACKAWANNA 4-6500

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MEDALS AND AWARDS
JEROME ALEXANDER
330 RIVERSIDE DRIVE
NEW YORK 25, NEW YORK

August 27, 1956

Greetings

Many branches of the whole chemical and allied industries everywhere owe by now directly or indirectly some of their developements to Perkin's genius.

The Society is proud to contribute to the Centennial Commemorating the Discovery of Aniline Dyes, and happy to welcome all visiting members of participating Soc.eties and friends to New York City on this occasion.

Lawrence Flett
President.

TELEPHONE: RITTENHOUSE 6-5315 — CABLE ADDRESS: TESTING

AMERICAN SOCIETY FOR TESTING MATERIALS

at Logan Square on the Benjamin Franklin Parkway

1916 RACE STREET, PHILADELPHIA 3, PA.

August 27, 1956

American Association of Textile Chemists and Colorists

Subject: Perkin Centennial

On behalf of the members and the Directors of the American Society for Testing Materials we congratulate your Association for the splendid way you have organized and publicized the celebration honoring Sir William Perkin. It is indeed a pleasure for our Society to participate with yours in the event, in recognition of our mutual interests and objectives. We are pleased to share your rostrum to honor one who did so much to advance the science and technology of organic chemistry and color.

Yours sincerely,

Robert J. Painter
Executive Secretary

RJP/n

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS & CHEMISTS

NATIONAL COUNCIL

President:
R. W. Ralston
P.O. Box 128
Chateauguay Basin, Que.

Secretary-Treasurer:
J. D. Wallace
(Local Legion)
4790 St. Ambroise St.
Montreal, Que.

August 27, 1956.

As President of the National Council of the Canadian Association of Textile Colourists and Chemists I am delighted to respond to your request for a few words in relation to the Perkin Centennial Number which will be issued prior to the opening of proceedings in New York on September 10th. The C.A.T.C.C. has been established for well over twenty years and like its sister organization in the United States, has done much to raise standards of technology and create a better understanding between men in all sections of the textile industry.

There is no doubt that William Henry Perkin's discovery of Mauve opened up great new vistas of development and commercial possibilities for the dyestuffs industry. Its impact on textiles and the whole synthetic organic field was far reaching, indeed. From the agenda of the New York meetings which I have studied with appreciation, I would say that the sessions will highlight in very certain fashion the work that Perkin did. Colour is a magic thing in our day to day living and without it life would, indeed, be a very drab affair.

Therefore, on behalf of my associates and myself, may I congratulate the A.A.T.C.C. for its initiative, vigor, and public spiritedness in organizing the Perkin Centennial which is just another example of its fine constructive work in all matters relating to textile processing. You can be quite sure that many Canadians will be present, to pay their tribute to the pioneer of the dyestuffs industry and also to collaborate with their colleagues in the United States. It should be a happy and productive occasion for all concerned and I extend good wishes for a most successful convention.

With kind regards, I am

Yours truly,

R.W.Ralston

President, National Council
Canadian Association of Textile
Colourists & Chemists

HWRsmhp

H. THOMAS HALLOWELL, JR
President
VAN H. GEICHLER
Vice-President
J. L. CRANWELL
Chairman, Executive Committee
A. S. JOHNSON
Chairman, Standards Council

AMERICAN STANDARDS ASSOCIATION

INCORPORATED
U. S. Member, International Organization for Standardization
70 East Forty-fifth Street
New York 17, N. Y.
Tel. MUrray Hill 3-3058

GEORGE F. HUSSEY, JR
Vice Admiral USN (Ret)
Managing Director and Secretary
CYRIL AINSWORTH
Technical Director and Assistant Secretary
G. P. FAINE
Public Relations Director and Assistant Secretary

August 27, 1956

On behalf of the American Standards Association and the International Organization for Standardization, I wish to send greetings and best wishes to the Perkin Centennial.

The ASA and ISO are privileged to be among those societies and associations cooperating with the AATCC in commemorating the discovery of aniline dyes. As co-sponsors of International Day, opening the Centennial, we will present a program designed to draw world-wide attention to man's inventive genius in creating a more colorful world.

The need for standardized chemical nomenclature to identify color is apparent. Tests for maintaining colorfastness must keep pace with technological developments in this and other countries. In a fast moving economic society, we believe that standards can make an important contribution to orderly progress.

The ASA and the national standards bodies of 36 nations holding membership in ISO provide increasing opportunities for advancing technical and scientific cooperation. In this spirit of men working together, we are pleased to be a part of the Perkin Centennial.

Sincerely yours,

G. F. Hussey, Jr.
Managing Director

THE

COLOR ASSOCIATION

OF THE UNITED STATES, INC.

FORMERLY THE TEXTILE COLOR CARD ASSOCIATION OF THE UNITED STATES, INC.

200 MADISON AVENUE, NEW YORK 16, N.Y.

MUrray Hill 5-5801-2-3-4

August 27, 1956

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It is a great pleasure for The Color Association of the United States to join in the celebration of the Centennial, sponsored by the American Association of Textile Chemists and Colorists, to pay tribute to William Henry Perkin and his far-reaching discovery of the first synthetic dye.

Our Association, one of the participating societies, has honored this occasion by issuing a commemorative brochure highlighting the original Perkin Mauve shade, the color of the Centennial, and two lighter tones in the same scale, Perkin Orchid and Perkin Lilac.

The significance of Perkin's historic invention is apparent today not only in the important field of synthetic dyes, but in every facet of industry and science in which color is an increasingly vital styling and merchandising force.

It has been the privilege of our Association to serve the color needs of fashion and industry since 1915, when it was founded as a non-profit organization. In this span of forty-one years, we have seen the influence of fashion colors spread to more and more branches of industry, including home furnishings, plastics, paints, automobiles and television. In tomorrow's dynamic world of fashion and industry, we envision an even wider use of color as a creative and sales force, fulfilling the desire for richer and more colorful living.

Through the medium of this Perkin Centennial issue of the American Dyestuff Reporter, we are happy to extend our congratulations and good wishes to the AATCC on this momentous occasion.

Cordially yours,

John M. Hughlett
President

JMH:AM

CABLE ADDRESS "STANDACOL" — CODES: A. B. C. 5TH & 6TH EDITIONS — WESTERN UNION FIVE-LETTER AND BENTLEY'S

Color lights the world

DRY COLOR MANUFACTURERS' ASSOCIATION

55 West 42nd Street : New York 36, N. Y.

Telephone LAckawanna 4-5241

August 27, 1956.

The Dry Color Manufacturers' Association welcomes this opportunity to extend to all of those who will attend and are participating in the Perkin Centennial its very best wishes. It is significant in these days of world-wide political furor that those throughout the world who are interested in commemorating such an event as the Perkin Centennial can get together in a spirit of friendliness and cooperation.

Sir William Perkin's discovery has been the cornerstone of the structure which comprehends colorants which have certainly resulted in "a more colorful world". The industries which constitute this structure should be ever grateful to this man of imagination and courage to act upon his discovery.

Sincerely yours,

John Kenney

President.

Good Housekeeping

FIFTY SEVENTH STREET AT EIGHTH AVENUE NEW YORK 19, N. Y.

Herbert R. Mayes, Editor

August 27, 1956

As a participant in the Perkin Centennial, Good Housekeeping looks forward to entertaining all of your readers at our fashion matinee, "Cavalcade of Color." We are deeply appreciative of this opportunity, and honored that the Good Housekeeping Institute has been chosen to dramatize the evolution of color in fashion.

Our Fashion Director, Nancy White, and our Director of Textiles, George Wham, are collaborating on this presentation, which will be a lively revue, utilizing professional stage talent to highlight the development of dyes as a major factor in fashion. Following the climax of William Henry Perkin's great discovery, "Cavalcade of Color" will emphasize the ever-growing contribution of synthetic dyes to apparel which meets the standards of Good Housekeeping's Textile Testing Laboratory.

To your readers' Centennial invitation to attend "Cavalcade of Color," I should like to add this personal one. On the afternoon of September 13th, it will be our pleasure and privilege to greet all members of the American Association of Textile Chemists and Colorists, and their Centennial guests.

Sincerely,

Herbert R. Mayes

Herbert R. Mayes, Editor

HRM/et

The Electrochemical Society, Inc.

AN INTERNATIONAL SOCIETY FOUNDED IN 1902 AND INCORPORATED IN 1930
ELECTROCHEMISTRY, ELECTROMETALLURGY, ELECTROTHERMICS, ELECTRONICS

HANS THURNAUER, PRESIDENT
CENTRAL RESEARCH LABS
MINNESOTA MINING & MFG. CO
2301 HUDSON ROAD
ST. PAUL, MINN.

TELEPHONE
RIVERSIDE 9-0600
(NEW YORK)

HENRY B. LINFORD, SECRETARY
COLUMBIA UNIVERSITY
NEW YORK, 27, N. Y.

ROBERT K. SHANNON, ASSISTANT SECRETARY
216 WEST 102ND ST.
NEW YORK 25, N. Y.

August 27, 1956

The Electrochemical Society, Incorporated, sends its greetings and best wishes for continuing success to the American Association of Textile Chemists and Colorists during their PERKIN CENTENNIAL.

Yours very truly,

Hans Thurnauer

Hans Thurnauer
President
The Electrochemical Society, Inc.

IFT. INSTITUTE OF FOOD TECHNOLOGISTS

THE PROFESSIONAL SOCIETY OF FOOD TECHNOLOGISTS

GEORGE F. GARNATZ PRESIDENT

THE KROGER FOOD FOUNDATION
1212 STATE AVENUE
CINCINNATI 4, OHIO

August 27, 1956

On the eve of The Perkin Centennial, the Institute of Food Technologists extends greetings and best wishes to The American Association of Textile Chemists and Colorists for a most successful meeting commemorating an epochal advance in synthetic organic chemistry and honoring Sir William Henry Perkin, whose discovery of mauve was the pioneering step in this advance.

The Institute of Food Technologists feels privileged in having a part in this significant event and hopes that from it a great measure of inspiration will be derived by those on whom the future depends.

Sincerely yours,

Geo. Garnatz

Geo. Garnatz, President

GG/da

TELEPHONE NATIONAL 8-2580

Manufacturing Chemists' Association, Inc.

(FOUNDED 1872)
1625 EYE STREET, N.W.
WASHINGTON 6, D. C.

JOHN S. HULL
General, U.S.A. (Ret.)
PRESIDENT

August 7, 1956

On behalf of the members of the Manufacturing Chemists' Association, Inc., it gives me a great deal of pleasure to extend our greetings to the American Association of Textile Chemists and Colorists and to tell you how happy we are to have the opportunity of cooperating with you in honoring William Henry Perkin in this his centennial year.

Cordially,

J. S. Hull

National Retail Dry Goods Association

100 WEST 31st STREET • CHickering 4-8780 • NEW YORK 1, N. Y.

PHILIP M. TALBOTT
President

J. GORDON DAKINS
Executive Vice-President and Treasurer

August 27, 1956

Greetings:

The National Retail Dry Goods Association, and its more than 8,000 members, are privileged to join the American Association of Textile Chemists and Colorists in honoring Sir William H. Perkins on the one hundredth anniversary of his discovery of synthetic dyes. To the textile chemists, we extend our most sincere congratulations for their accomplishments during the past century. The great strides made in developing the tremendous synthetic dye industry have opened vast new worlds of fashion with marked impact on the retail field. We are looking forward to even greater achievements in the years ahead which will assure the utmost consumer appeal in quality, style color and fashion.

Philip M. Talbott
President

National Paint, Varnish and Lacquer Association

INCORPORATED
1500 RHODE ISLAND AVE., N.W. — WASHINGTON 5, D. C.

OFFICERS

REGIONAL VICE PRESIDENTS

DIVISIONAL VICE PRESIDENT

OFFICE OF THE PRESIDENT

August 27, 1956

The Paint, Varnish and Lacquer Industry joins with countless others of the scientific and technical world in honoring the memory of Sir William H. Perkin, by celebrating Perkin Centennial Week, September 10 - 15. We owe him our everlasting gratitude and deep respect for his contribution of beautiful and glamorous materials not only to our industry and to all of our peoples, but for his forethought that made this a more colorful world in which to live. We, along with other industries, salute and honor Sir William for his ability, imagination and brilliant work.

Joseph F. Battley

JOSEPH F. BATTLEY
President

Optical Society of America

RALPH A. SAWYER, *President*

1006 RACKHAM BUILDING
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

July 24, 1956

I am most happy to take advantage of the opportunity afforded by your suggestion of July 3, 1956 to send the greetings of the Optical Society of America to the American Association of Textile Chemists and Colorists and to congratulate the Association for taking the initiative in organizing the Perkin Centennial.

In the 100 years that have elapsed since William Henry Perkin succeeded in producing the first synthetic dye, a great development of organic chemistry based on this discovery has taken place. We recognize the importance of this discovery because our members have had to devise instruments and methods for measuring the colors, not only of the host of new synthetic dyes that have since been created but also of the textiles, paints, and plastics colored by them. Nor does the optical influence of Perkin's discovery stop with the measurement of color. The measurement of other optical properties of the new organic chemicals requires refractometers, turbidimeters, fluorophotometers, and phase-contrast and polarizing microscopes. Furthermore, among the new organic chemicals we find many that are important to the science of optics. We find not only the dyes used in color photography but also the developers used for photography of all sorts. We find the cements that unite the glass parts of our optical systems, and we find plastics that may often be substituted with advantage as optical elements for the traditional glass or crystal. For these reasons we are glad to participate in the Perkin Centennial by designating our member, Mr. Frank J. O'Neil, to present a paper entitled Color Control - Twenty-Five Years Progress.

Again, our congratulations to the American Association of Textile Chemists and Colorists for organizing the Perkin Centennial, and congratulations, too, to the American Dyestuff Reporter for devoting an entire issue to it.

Sincerely yours,

Ralph A. Sawyer

Ralph A. Sawyer

RAS:fh

Society of Chemical Industry

American Section

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August 27, 1956

On behalf of the membership of the American Section of the Society of Chemical Industry, I send warm greetings to you and all of your colleagues of the American Association of Textile Chemists and Colorists.

As one of the participating organizations in the Perkin Centennial Week, we wish to convey through your PERKIN CENTENNIAL ISSUE our greetings also to the many other organizations that are participating in this commemoration. The week of programs marking the Perkin Centennial will be a proper recognition of one of the great landmarks in organic chemistry.

With personal good wishes.

Yours sincerely,

M. E. Spaght

The Society of Dyers and Colourists

Founded 1884. Sections - London, Huddersfield, Manchester, Midlands, Northern Ireland, Scottish, West Riding of Yorkshire. Junior Branches: Bradford, Leeds, Manchester. Affiliations: The Society of Dyers and Colourists of Australia and Dyers and Colourists Association of South Africa

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19 PICCADILLY BRADFORD 1 YORKSHIRE Telephone 25138-9

27th August, 1956

As President of the Society of Dyers and Colourists, it is a great pleasure to express the warm greetings of the Council and Members of the Society to all our American friends on the occasion of the Perkin Centennial.

Sir William Perkin was the President of our Society at the time of his death and we feel, therefore, that our link with you at this time is a very special one.

Sir William Perkin was a man of great modesty and he would have been much moved by the celebrations you have planned in honour of his memory as a scientist and technologist. He was also a man of great humanity and would have been proud to feel that he had contributed not only to the foundations of the American dyestuffs industry but also to the good relations between our two countries.

It will be a great honour for me to represent our Society at your Centennial Celebrations.

Clifford Paine.

PRESIDENT

SOCIETY OF COSMETIC CHEMISTS

2 EAST 63rd STREET, NEW YORK 21, N. Y.

Administrative Assistant: WILLIAM R. GIESE TEmpleton 2-8665

August 27, 1956

The Society of Cosmetic Chemists is pleased to welcome all of those attending this highly appropriate meeting honoring the memory of William Henry Perkin. His discovery of mauve 100 years ago led to research which has contributed many types of products to the cosmetic industry. Our Society is happy to participate in this meeting and trust that all of you attending and participating will find the meeting well worthwhile.

Cordially yours,
SOCIETY OF COSMETIC CHEMISTS

George G. Kolar

George G. Kolar
President

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION

41 EAST FORTY-SECOND STREET
NEW YORK 17, N. Y.

R. WOLCOTT HOOKER
PRESIDENT

August 27, 1956

The Synthetic Organic Chemical Manufacturers Association extends to you a sincere greeting on this occasion of the celebration of the Perkin Centennial.

We share your pride in the spectacular growth of the organic chemical industry from such an humble beginning to its present vital position as the keystone to our nation's economy and security.

Sincerely yours

R. Wolcott Hooker

R Wolcott Hooker

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MUrray Hill 2-8313

August 27, 1956

On the occasion of the Centennial celebration of the birth of William Henry Perkin, the Technical Association of the Pulp and Paper Industry extends greetings to the American Association of Textile Chemists and Colorists and commends the Association for its foresight in recognizing this anniversary which is important to all industries that have benefited by his discovery.

Cordially yours,

R G Macdonald

Secretary

RGM/nr

TEXTILE RESEARCH INSTITUTE

PRINCETON, NEW JERSEY

27 August 1956

Greetings:

On behalf of the officers, trustees, and membership of Textile Research Institute, it is a pleasure to transmit hearty congratulations to the American Association of Textile Chemists and Colorists on this great occasion of the Perkin Centennial. The whole affair is brilliant in concept, and the program which has been arranged is outstanding. The Institute is indeed honored to be among the organizations participating in the planning and execution of this important meeting, under the able leadership of Raymond W. Jacoby and his colleagues of AATCC.

Cordially,

J. H. Dillon

J. H. Dillon
Director

JHD:lc

THE SECRETARY OF COMMERCE
WASHINGTON 25

The U. S. Department of Commerce is pleased to join with other governmental, industrial and research organizations in recognizing the 100th Anniversary of the discovery of the first synthetic dye, which will be celebrated by the Perkin Centennial Week in New York City, September 10 to 16.

The impact of color in commercial commodities and advertising is of great importance and it is obvious that much of this color comes from the American synthetic dye industry.

In behalf of the Department of Commerce and our commercial and scientific research staff, I take pleasure in extending our greetings and best wishes on this important and colorful occasion.

Sincerely yours,

Sinclair Weeks

Secretary of Commerce

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DYESTUFFS OF THE ANCIENTS

NELSON S KNAGGS

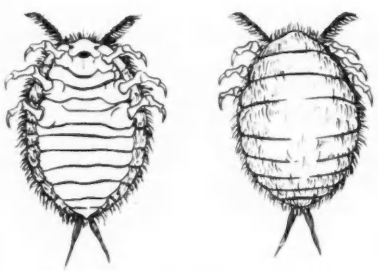
Vice President, The Hilton-Davis Chemical Co Div

INTRODUCTION

ALTHOUGH this year marks the 100th anniversary of the discovery of the first synthetic dyestuff by Perkin, this one hundred years represents possibly only one half of a percent of the time that has lapsed since man commenced to use dyes for decorating his fabrics.

The story of the manufacture, collection, trade and application of the colors of ancient man reads like a romantic novel. So, let up pause in retrospect to view the highlights of the history of natural dyes up until the momentous day in 1856 when Perkin consigned them to near oblivion.

Since the dawn of civilization, man has been attracted by color and has used it lavishly to express his emotions—to excite and subdue, to attract and repel. The early cave-dwellers employed color in their paintings, bright dyes decorated the funeral robes of the ancient Egyptians, and gem-like hues enriched the fine, hand-loomed textiles of the Maya, Inca, and Aztec. . . . Asia, Africa, and America, the story of color has been the same. Unlike other inventions, which usually originated in one country and spread slowly to other lands, color seemed to be the insatiable desire of man everywhere. Consequently, news of the use of it and the knowledge of its sources did not migrate from one continent to another, or from one island to the next. From the beginning, Man engaged in a search for color-producing materials near his immediate surroundings; and, as a result, the use of color was one of his first inventions. Color was a spiritual necessity flowing within his bloodstream, as were his physical instincts for food, drink, and reproduction. In his early search for color, Man turned to Nature, discovering dyes in insects and mollusks, in the leafy foliage and the roots of plants, in berries, and in pollen from flowers. The insoluble colors, or pigments, were taken from the minerals of the earth.



Cochineal
(Coccus Cacti)

Man even believed certain colors to have magic powers, capable of warding off evil spirits, and used them accordingly. Later, color became a physical necessity for adorning his body, clothes, and dwellings, as well as his working implements. As Man began to explore the surface of the earth in search of better food and lands, he discovered that other people were using dyes unknown to him and, in many cases, superior to his own. Thus commenced one of the earliest forms of industrial commerce —the trading or bartering of dyes. Cities sprang up and became centers of dye-making and trading. Notable among these was Tyre on the Phoenician coast, which achieved its prominence because the tiny seashell mollusk, source of the most famous of all purple dyes, Tyrian purple, was found near this ancient city.

Actually, hundreds of dyes from Nature have been catalogued as sources of color, but only about twenty-four became really important commercial items and rose above the others for their superior qualities, surviving as valuable articles of trade for nearly 4000 years.

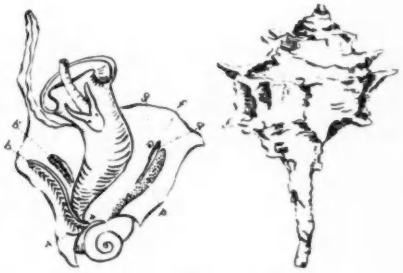
Eight of the twenty-four dyes stood head and shoulders, as to their usage, above the rest. A brief summary of their history follows.

COCHINEAL

When Cortes, the Spanish conquistador, invaded Mexico in 1518 AD, he discovered the Aztecs coloring their textiles with a bright red dye produced from the bodies of a tiny female insect which the Spaniards named "cochineal."

This new dye-producing insect, which was also used by the Aztecs for tribute, was sent to Spain where it was evaluated as being superior to "kermes," another dye-producing insect used extensively through Europe and the Far East. The Spanish Crown held a monopoly on cochineal for 400 years and forbade the export of the live insect. Then, with unrest fomenting in Mexico, live insects were sent to Spain, thus breaking the monopoly.

The cochineal measures 1/10 of an inch and lives upon the cactus plant, *Nopalea coccinellifera*. Seventy thousand dried insects produce one pound of dye. Principal coloring matter is carminic acid, which is soluble in water and forms bright color lakes with metallic mordants.



Tyrian Purple
(Murex Brandaris)
(Murex Tranculus)

TYRIAN PURPLE

This most important of all ancient purple dyes, extracted from a tiny gland in the body of the mollusks, *murex brandaris* and *murex trunculus*, derived its popular name from the ancient city of Tyre, situated on the Phœnician coast, which, by 1500 BC, became the center of trading and manufacture of Tyrian purple.

The small amount of color in each mollusk—12,000 animals being required to produce one gram of dye—made it the most expensive of all ancient dyes. It was used for coloring the togas of the Roman emperors and gave rise to the expression, "born to the purple." Zapotec women, from the Isthmus of Tehuantepec, Mexico, also use a similar mollusk, *purpura haemostoma*, for dyeing their cotton thread. The Zapotecs do not kill the animal, but blow on it, and the animal releases the purple dye. The thread is dyed on the spot by passing it over the excretion.

Madder
(Rubia Tinctorum)

MADDER

Madder, one of the most ancient red dyes, is extracted from the roots of a plant, *rubia tinctorum*. The mature plant was allowed to remain in the earth from eighteen to twenty-four months in the belief that aging improved the quality of the dye. After removal from the ground, the roots were washed, dried, and finely milled, and stored in casks.

The history of the use of madder as a dyestuff is lost in antiquity. Although it probably had its origin in India, madder was also used extensively in Egypt, Persia, and in Greece and ancient Rome. It is said to be the foundation of the Egyptian dye industry and has been identified as one of the colors on a fabric from the tomb of Tutankhamen of the Eighteenth Dynasty.

Because of its beauty, fastness, and range of shades with various mordants, madder was used extensively until 1868, when alizarine, the chief coloring component of madder, was produced synthetically.

INDIGO

For 4000 years, indigo was regarded as the most important of all natural dyestuffs. The blue dye-producing plant, *indigofera tinctoria*, probably originated in India, as this country was its chief exporter. Spanish explorers in the New World, however, found the natives—particularly in Mexico, Guatemala, and Peru—utilizing a blue dyestuff from a plant of the indigo family. Later, archæologists confirmed the wide-spread use of indigo from examination of burial cloths from Egypt to Peru.

The color intermediate is obtained mainly from the leaves of the indigo plant and is a soluble, colorless glucoside known as indican. The leaves are steeped and allowed to ferment, and a clear yellow liquid is formed which contains the white indican. The indican, being soluble in water in an alkaline solution, is readily absorbed on fibers. Upon agitation, the indigo white oxidizes to insoluble indigo blue. This process of coloring is known as vat dyeing.

SAFFRON

Saffron, a bright, rich, yellow dye obtained from the stigmata of the *crocus sativus* plant, was not only used as a textile dye by the ancient Persians, Chinese, Indians, Greeks, and Romans, but also, as a coloring and flavoring agent for foods and as a medicine. Monks of the Middle Ages discovered that by combining Saffron with an iron mordant they could produce inks for their illuminated manuscripts, which resembled gold.

Indigo
(Indigofera Tinctoria)

Saffron was the most expensive yellow dyestuff of the ancients due to the fact that 4000 stigmata were required to produce one ounce of dye. The three long stigma of each flower are the saffron of commerce; the red-orange tip being first quality dye and the remaining portion being of lesser value.

Saffron is still grown in the Kashmir in India and is used for dyeing holy men's robes, as well as for coloring and flavoring of confectionery rice and curry in India and Pakistan.

SAFFLOWER

The safflower, as a dye-producing plant, probably had its origin in South Asia; however, it was cultivated from ancient times in China, India, Persia, and Egypt, where it was also used as a foodstuff and as a medicine. In Greece it was rated as the official color. The yellow dye from safflower is similar to saffron, although the two plants from which the dyes are derived are not related botanically.

Safflower dye is obtained from the flowering head of the plant. The florets are harvested by hand when in full bloom. The fugitive soluble yellow dye is removed from the florets by agitating in water. The mass is then pressed and dried and made ready for market.

The coloring matter of the plant is composed of a small per cent of insoluble red and a soluble yellow. Depending on whether the dye is mixed with an acid or alkali, various shades of yellow, orange, red, and pink are obtained with Safflower dye.

WOAD

For nearly 1200 years, woad was considered the most important blue textile dye in Western Europe and was not replaced by the brighter, but more fugitive, indigo until late in the Fourteenth Century when the latter commenced to be imported from India. Nearly 2000 years ago, when Julius Caesar's Roman Army invaded England, he discovered that the aboriginal natives there were tattooing their bodies with weird designs. The pattern was applied with

Saffron
(Crocus Sativus)

flint instruments, and the coloring matter used was from woad.

The plant is supposedly indigenous to the countries of the Levant and to southeast Russia. The author has also learned of the plant's growth in the Shenandoah National Park in Virginia.

The blue dye is obtained from the leaves of the woad, which are partly dried, formed into balls, dried further for about four weeks, ground again, spread out and sprinkled with water. The leaves are then allowed to ferment for about nine weeks. After fermentation ceases, the stiff paste is ready for marketing.

LOGWOOD

Logwood was discovered by the Spaniards near the Bay of Campeche, Mexico, shortly after their conquest of the New World. Quick to see its value as a purple dye on wool, blue and black on cotton and wool, and violet and black on silk, the Spaniards introduced logwood dye to dyers of Europe shortly after its discovery. It is still used to some extent as a cotton dye, and it is interesting to note that in our laboratories a black color lake made from logwood was invented for use in the first bleachable ink for printing telephone directories, permitting recovery of millions of pounds of paper pulp each year.

Logwood is obtained from a large tree which is indigenous to sub-tropical and tropical America. The wood, in its natural state, is colorless. The color is produced by reducing the wood to chips or a paste. This is thoroughly wetted, causing fermentation to take place, in the process of which the color is developed.

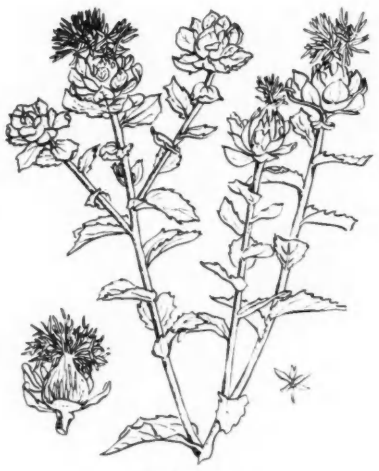
Woad
(Isatis Tinctoria)

OTHER DYESTUFFS OF THE ANCIENTS

ANNATO———A fugitive orange-red dye produced from the pulpy part of the seeds of the Indian plant, *Bixa orellana.*

BARWOOD———A deep blue dye obtained by powdering and boiling the wood of the barwood tree, native to Equatorial West Africa.

BRAZILWOOD———A bright red textile dye produced by powdering and fermenting the wood of the *Caesalpinia echinata.* The country of Brazil derived its name from the tree, which a Portuguese expedition discovered growing in great quantities along the east coast of South America. Recognizing the tree, the explorers dubbed the land "Terra de Brasil."



Safflower
(Carthamus Tinctorius)

CUDBEAR———A lilac-colored dye extracted from the lichen, *Lecanora tartarea.*

CUTCH———A rich, brown dye extracted by boiling the wood of *Acacia catechu,* native to India.

KERMES———A red dye extracted from the bodies of the tiny insect, *Coccus arborum.* Next to lac and cochineal, it is one of the oldest red dyes, but was replaced by cochineal after the latter was introduced to the Old World from Mexico.

LAC———A bright red dye obtained by boiling the tree incrustation produced by the tiny lac insect, *Tachardia lacca.* Shellac was used as a textile dye long before the discovery of its values as a protective coating. The lac insect is a close relative of the cochineal and kermes insects.

Logwood
(Haematoxylon Campechianum)

ORSEILLE———A reddish-purple dye extracted from the lichen, *Lichen Rocella tinctoria,* found on rocks of Mediterranean islands.

QUERCITRON———A brown to yellow dye produced mainly from the inner bark of the black oak, *Quercus nigra.*

TURMERIC———A yellow dye extracted from the roots of the plant, *Curcuma longa.* This dye is still used today in India for carpet dyeing.

YOUNG, or ZANTE FUSTIC——— A yellow to dark olive dye, depending on the mordant used, is extracted from the powdered wood of the *Rhus cotinus,* a shrub-size tree of the cashew family.

OLD FUSTIC———Colors ranging from gold to yellow obtained from the wood of the tropical American tree, *Chlorophora tinctoria.* This dye is still used on wool.

Among the more important other plants producing natural dyes are: Bengal kino tree, *Butea monosperma;* pomegranate, *Punica granatum;* Syrian rue, *Peganum harmala;* Indian madder, *Rubia cordifolia;* henna plant, *Lawsonia inermis;* tamarind tree, *Tamarindus indica;* tulip tree, *Thespesia populnea;* Babul tree, *Acacia scorpioides;* monkey-face tree, *Mallotus phillippinensis;* red sandalwood, *Pterocarpus santalinus;* bael tree, *Aegle mermelos,* etc.

SIR WILLIAM HENRY PERKIN

SIDNEY M EDELSTEIN
Dexter Chemical Corp
New York, N Y

ON Sunday night, July 14th, 1907, Sir William Henry Perkin, the founder of the coal tar industry, died from double pneumonia after an illness of four days. One would surely expect that the passing of a man whose work had affected the economy of the great western powers in such a grand manner would have been the subject of front page stories, editorials and discussions in contemporary newspapers in New York, London, Paris and Berlin. An examination of these newspapers would prove quite disappointing.

In searching through the July 15th, 1907, issue of the *New York Times*, one is finally rewarded by finding, in the next to the last column, and almost at the bottom of the page, an unobstrusive writeup of William Perkin's death and some mention of his work. On the same page the headlines proclaim that, "new exhaust fans installed in the subway make riding cooler," and that "the Peter J Dooling Association of the 9th assembly district had a steamboat outing to College Point." The obituary of a 500-pound woman receives practically the same space and attention as that of Perkin. The fact that this woman's coffin was so heavy that it would require 12 men to lift was apparently of equal interest wth the fact that the industry which Perkin had founded, in Germany alone then employed 120,000 men (*H1*).

The *Times of London* was more generous. After all, Sir William Perkin was an Englishman. The *Times* devoted almost a full column to the death of Perkin, and this held the spotlight with the court circular, the mail and shipping intelligence, and such choice announcements as, "Mrs Frank Mackey has postponed her concert;" and that, "Mark Twain had left by the 9:55 boat train for Tilbury for a return to New York (*H2*)."

For us, however, on the occasion of the 100th anniversary of Perkin's discovery of mauve, and some 49 years after his death, it is most fitting that we not only pay homage to the great man but that the detail of his life and work be re-examined and re-recorded for new generations who will continue to reap benefits resulting from his great discovery.

Unfortunately, there is still a paucity of information about Perkin's early life and even about certain periods of his middle years. Not many scientists knew him well, and there is little original written information. The main primary sources of information concerning the man himself consist of the 42-page obituary notice written by Meldola for the *Journal of the British Chemical Society* (*H11*); a paper which Perkin wrote in 1896 on the origins of the coal-tar industry (*B48*), and a little volume published on the occasion of the 50th anniversary of the discovery of mauve and of the foundation of the coal-tar industry (*H29*). Additional scattered information may be found in some of Perkin's own lectures as well as in occasional notices in the British Technical Press. From these limited sources we are able to put together a connected story.

—SOME LITTLE KNOWN FACTS ABOUT PERKIN AND HIS WORK—

Perkin never was graduated from college and his degrees were all honorary.

The first artificial coloring matter discovered by Perkin was not mauve but an azo dye which was patented after his patent on mauve.

Perkin called his new color, aniline purple or tyrian purple. The name mauve was given to Perkin's dyestuff by the French.

Perkin's mauve had first ready acceptance by the French dyers and printers, not by the English.

Mauve lasted only ten years and was replaced not by faster dyestuffs but by fugitive dyestuffs with greater brilliance.

Perkin's factory was not the largest synthetic dyestuff manufacturer but one of the smallest in England or France.

Perkin devoted most of his working life to pure organic and physical chemical research with only a minor part devoted to dyestuffs or chemical manufacturing.

During most of his life Perkin was best known to the scientific world for his work in organic chemistry, not for his work on dyestuffs.

Perkin synthesized the first synthetic perfume, coumarin.

Perkin did not receive the credit to which he was entitled for his work in creating the synthetic dyestuff and organic chemical industry until he was an old man.

The statement "Perkin would not have discovered mauve if he had used pure aniline," is false. This refers to the discovery of magenta by a Frenchman a few years later. The preparation of magenta required an impure aniline containing toluidine.

Sir William Henry Perkin was born in London on March 12, 1838. His Father was George Fowler Perkin, a builder and contractor, who died in 1865 at the age of 63. As a very young boy Perkin entered the City of London School with a very distinct bias for chemistry. The manner in which the young Perkin became interested in chemistry is revealed in his own words spoken some years later (*H11*):-

"As long as I can remember, the kind of pursuit I should follow during my life was a subject that occupied my thoughts very much. My Father was a builder, the first idea was that I should follow in his footsteps, and I used to watch the carpenters at work, and also tried my hand at carpentering myself. Other things I noticed led me to take an interest in mechanics and engineering, and I used to pore over an old book called 'The Artisan,' which referred to these subjects and also described some of the steam engines then in use, and I tried to make an engine myself and got as far as making the patterns for castings, but I was unable to go any further for want of appliances. I had always been fond of drawing, and sometimes copied plans for my Father, whose ambition was that I might be an architect. This led me on to painting, and made me think I should like to be an artist, and I worked away at oil-painting for some time. All these subjects I pursued earnestly and not as amusements, and the information I obtained, though very elementary, was of much value to me afterwards. But when I was between twelve and thirteen years of age, a young friend showed me some chemical experiments and the wonderful power of substances to crystallise in definite forms, and the latter especially struck me very much, with the result that I saw there was in chemistry something far beyond the other pursuits with which I had previously been occupied. The possibility also of making new discoveries impressed me very much. My choice was fixed, and I determined if possible to become a chemist, and I immediately commenced to accumulate bottles of chemicals and make experiments."

Figure 1
Perkin at age 14 (1852)
from a photo taken by himself

At the time Perkin entered the London School, science was not a part of the curriculum, but fortunately, a Mr Hall, one of the class masters, was in the habit of giving two weekly lectures on chemistry and natural philosophy during the dinner hour. Perkin attended these lectures, often at the sacrifice of his mid-day meal, and was soon permitted to help Mr Hall with the lecture demonstrations.

While Perkin's father was opposed to a career in chemistry, nevertheless, through the intercession of Mr Hall, Perkin entered the Royal College of Science at the age of 15; listened to the chemical lectures of the great German chemist, Hofmann, and finally, in his 17th year, was appointed to an assistantship under Hofmann. This latter work allowed Perkin no time for his own research and therefore the boy fixed up a laboratory in his home where he could try his own chemical experiments in the evenings. One of the first pieces of private research that Perkin carried on in his own home was concerned surprisingly enough with a coloring matter even before his discovery of the mauve. In collaboration with Arthur H Church, Perkin began the investigation of the products of reduction of dinitrobenzene and dinitronaphthalene. From the latter they obtained a colored substance which they named 'nitrosonaphthyline.' This coloring matter was the first representative of the group of azo dyes derived from naphthalene ever manufactured and subsequently was the subject of a patent and actually had a limited use as a dyestuff (*B1, A5*).

Perkin's discovery of "mauve" took place during the Easter vacation of 1856 when he was just 17 years old. Hofmann had previously made some remarks about the desirability of preparing quinine artificially. Perkin, basing his experiments on ideas which we know today to be unsound, first treated toluidine and then an aniline salt with bichromate of potash and obtained not quinine but a dirty dark precipitate from the latter *(B48)*.

It was the custom in those days for the organic chemist to be interested only in clear crystalline materials while dark tarry masses were always discarded as being worthless. Not so with Perkin. Some instinct caused him on this occasion to examine this dark mass. From this 'useless' substance he isolated the first dyestuff to be produced commercially from coal tar—mauve or aniline purple. It has been stated that, had Perkin experimented with pure aniline instead of with a rather crude material then

Figure 2
Perkin at age 22 (1860)

available, his experiments would have been a failure and no valuable dyestuff would have been discovered. This is not so; on the other hand it is true that magenta would not have been discovered, as it was several years later, had not the aniline used in the experiment been contaminated by toluidine (*B48, H11*).

Almost immediately Perkin sent a sample of his dyestuff to a firm of dyers in Perth with the request that they try it on silk. Their report was *(B48)*:— "If your discovery does not make the goods too expensive, it is decidedly one of the most valuable that has come out for a long time."

While the first trials on cotton were unsuccessful (because no one realized the need for mordanting cotton), Perkin was not completely discouraged and he decided to patent the process for manufacturing the dyestuff. It was not long before he had worked out methods for applying his mauve to cotton by means of mordants (*A1*):-

"The nature of my invention consists in producing a new colouring matter for dyeing with a lilac or purple colour stuffs of silk, cotton, wool, and other materials in the manner following: I take a cold solution of sulphate of aniline, or a cold solution of sulphate of xylidine, or a cold solution of sulphate of cumidine, or a mixture of any one of such solutions with any others or other of them, and as much of a cold solution of a soluble bichromate as contains base enough to convert the sulphuric acid in any of the abovementioned solutions into a neutral sulphate. I then mix the solutions and allow them to stand for 10 to 12 hours, when the mixture will consist of a black powder and a solution of a neutral sulphate. I then throw this mixture upon a very fine filter, and wash it with water till free from the neutral sulphate. I then dry the substance thus obtained at a temperature of 100°C, or 212°F, and digest it repeatedly with coal-tar naphtha, until it is free from a brown substance which is extracted by the naphtha. Any other substance than coal-tar naphtha may be used in which the brown substance is soluble and the colouring matter is not soluble. I then free the residue from the naphtha by evaporation, and digest it with methylated spirit, or any other liquid in which the colouring matter is soluble, which dissolves out the new colouring matter. I then separate the methylated spirit from the colouring mat-

Figure 3
Bust of Perkin by Pomeroy

ter by distillation, at a temperature of 100°C or 212°F."

Surprisingly enough, the father agreed to back his son with financial and other types of support. When Perkin and his father discussed the possibilities of manufacturing the dyestuff with Hofmann, they met with discouragement but nevertheless father and son decided to go ahead with the venture. (Hofmann should not be condemned for his wrong advice, for anyone using ordinary sound business judgment would certainly have discouraged the two from what appeared to be almost impossible. **Picture the team that was to found our modern organic chemical industry:** a young man of 17 with no factory or business experience and a limited chemical knowledge, together with a builder having no knowledge of chemistry or manufacturing whatsoever).

A building was commenced at Greenford Green in June, 1857. Perkin wrote years later (*B48*):-

> **"At this time neither I nor my friends had seen the inside of a chemical works, and whatever knowledge I had was obtained from books. This, however, was not so serious a drawback as at first it might appear to be; as the kind of apparatus required and the character of the operation to be performed were so entirely different from any in use that there was little to copy from."**

The many practical problems which Perkin and his associates had to overcome seem large in comparison with the actual discovery of the dyestuff itself. Raw materials which were needed to manufacture the dyestuff were almost as scarce as rare elements. One of the first problems was to devise a method for making aniline from benzene. Even obtaining a satisfactory supply of benzene was in itself a problem. Perkin and his brother searched the whole country before they were able to obtain a reasonable supply of benzene for which they paid $1.25 per gallon. When they finally got this material into their factory it was so poor that it had to be redistilled.

Nitric acid of sufficient strength to convert benzene to nitrobenzene was not available and the Perkins had to manufacture their own, which in turn required the building of special apparatus.

Finally, the method of converting nitrobenzene to aniline had to be worked out by this 18-year old boy and he had to devise the technique and the apparatus.

In spite of all the obstacles, within six months Perkin's dyestuff under the name of 'aniline purple' or 'tyrian purple' was being used in a London dyehouse and within a short time other concerns in France and England began its manufacture (*B48*).

It is interesting to note that, in spite of Perkin's great pioneering work, the recognition of the value of his dyestuff took place quite slowly in Great Britain. It was not until the French had realized its great value that its use became general in Britain. In fact, the name "mauve", by which Perkin's dyestuff has been known to this day, was given to it in France. A few months before his death Perkin remarked on this (*B48*):-

> **"The value of the mauve was first realized in France, in 1859. English and Scotch calico printers did not show any interest in it until it appeared in French patterns, although some of them had printed cloth for me with that colour."**

It should also be noted that, along with the great difficulties involved in manufacturing a completely new chemical and starting a new industry, Perkin was troubled with the problem of introducing his new dyestuff to the trade. This latter was extremely difficult, for Perkin had had no contact with the dyeing industries up until his discovery of his new dyestuff.

A.D. 1856 . . . . . N° 1984.

Dyeing Fabrics.

LETTERS PATENT to William Henry Perkin, of King David Fort, in the Parish of Saint George in the East, in the County of Middlesex, Chemist, for the Invention of "PRODUCING A NEW COLORING MATTER FOR DYEING WITH A LILAC OR PURPLE COLOR STUFFS OF SILK, COTTON, WOOL, OR OTHER MATERIALS."

Sealed the 20th February 1857, and dated the 26th August 1856.

PROVISIONAL SPECIFICATION left by the said William Henry Perkin at the Office of the Commissioners of Patents, with his Petition, on the 26th August 1856.

I, WILLIAM HENRY PERKIN, do hereby declare the nature of the said Invention for "PRODUCING A NEW COLORING MATTER FOR DYEING WITH A LILAC OR PURPLE COLOR STUFFS OF SILK, COTTON, WOOL, OR OTHER MATERIALS," to be as follows:—

Equivalent proportions of sulphate of aniline and bichromate of potassa are to be dissolved in separate portions of hot water, and, when dissolved, they are to be mixed and stirred, which causes a black precipitate to form. After this mixture has stood for a few hours it is to be thrown on a filter, and the precipitate to be well washed with water, to free it from sulphate of potassa, and then dried. When dry it is to be boiled in coal-tar naptha, to extract a brown

Figure 4
First page of patent on Mauve

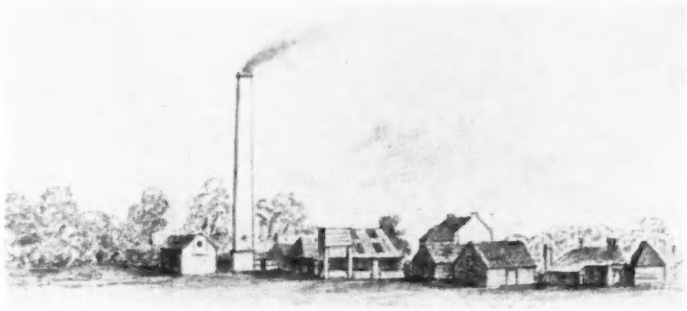


Figure 5
Greenford Green Works, 1858

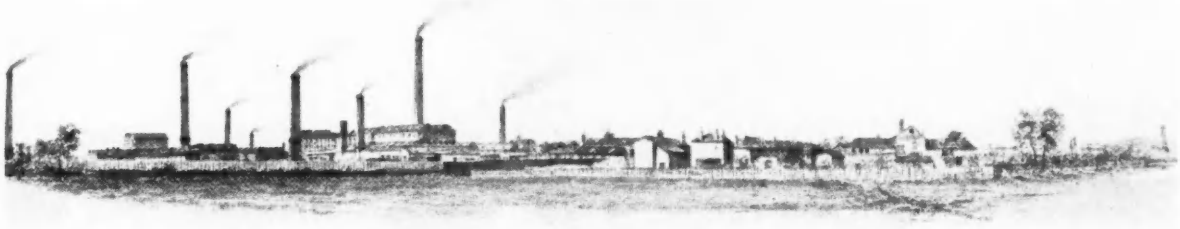


Figure 6
Greenford Green Works, 1873

When the dyestuff was first tried on silk on a large scale, it took on unevenly and Perkin had to spend many weeks working out a solution even to this problem. The answer was the use of a soap bath for dyeing the dyestuff onto the silk. In the case of dyeing wool and cotton, even more difficult pioneering work had to be done. Perkin's application problems are summed up in his own words (*B48*):-

> "I distinctly remember the first time I induced a calico printer to make trials of this colour that the only report I obtained was that it was too dear, and it was not until nearly two years afterwards, when French printers put aniline purple into their patterns, that it began to interest English printers.
>
> "Before the aniline purple could be introduced for dyeing woolen and mixed fabrics, some weeks were also spent at Bradford in finding out suitable methods of applying it.
>
> "Thus it will be seen that in the case of this new colouring matter, not only had the difficulties instant to its manufacture to be grappled with, and the prejudices of the consumer overcome, but, owing to the fact that it belonged to a new class of dyestuffs, a large amount of time had to be devoted to the study of its applications to dyeing, calico printing, etc. It was, in fact, all pioneering work—clearing the road, as it were, for the introduction of all colouring matters which followed, all the processes worked out for dyeing silk, cotton, and wool, and also for calico printing, afterwards proving suitable for magenta, hofmann violet, etc."

As usually happens when a new industry becomes successful, Perkin's position was soon assailed by imitators. Many patents appeared for making mauve which were only slight modifications of Perkin's original patent. Fortunately for Perkin, none of these modified processes yielded mauve as cheaply as Perkin's original 'bichromate' method (*H11*).

Perkin's introduction of mauve also led others to additional discoveries of dyestuffs derived from coal tar and gave the impetus to the establishment of other dyestuff factories. Particularly important was the discovery of magenta. Some five years after the start of Perkin's Greenford factory, Hofmann found that magenta, when ethylated or methylated, gave violet coloring matters, and Hofmann's violets, and a bit later certain rosanilines, began to compete with Perkin's mauve. Finally the discovery of methyl-violet and other related colors by Lauth enlarged the competitive picture. The newer dyestuffs were much less fast than mauve but they were much more brilliant. It was not long before the public became more concerned with brilliance than with fastness. These developments gradually caused a decline in the demand for mauve, which, within a few years, died out altogether. It has been said that, while mauve was a flourishing branch of the color industry, it did not complete ten years of existence (*B48*).

Perkin was able to keep his factory going in spite of the adverse effect of the discovery of the new dyestuffs. In 1864 he introduced a new method for the alkylation of magenta, which enabled him to compete with the other violet coloring matters. These dyestuffs were introduced under the name of britannia violets and were furnished in different shades of blueness, which were obtained by varying the degree of alkylation (*H11*).

A revitalization of Perkin's manufacturing position happily occurred in the year of 1868 with the announcement of the synthesis of alizarin, the natural coloring matter of madder, by Graebe and Liebermann. Fortunately, for Perkin, their process was far too expensive to be of more than scientific interest. The starting material for their synthesis of alizarin was anthracene, a coal-tar chemical with which Perkin had become familiar while studying with Hofmann. The work of Graebe and Liebermann aroused Perkin's interest and in less than a year he had worked out a successful commercial process which soon made synthetic alizarin the prime red dye in place of madder (*A8, A9*). The same problems which confronted Perkin in obtaining benzene were even greater in the case of anthracene. Nevertheless, by the end of 1869, Perkin's company had made a ton of alizarin and by 1871 they were making 220 tons per year.

By 1873, continental competition in the manufacture of alizarin had reached the point where Perkin and his associates realized that expensive changes in the plant at Greenford Green would have to be made. Perkin's ambition from the very beginning of his work on mauve had always been to devote himself to pure science. By 1873, however, Perkin found that his manufacturing establishment had provided him with the means for retirement on a rather modest basis. In 1874 his factory was sold and Perkin at the age of 36 retired from industry to devote his life to pure research (*H11*).

Perkin's work in pure research did not only just begin after his retirement from the dyeing industry. It seems almost unbelievable that, simultaneously with the starting of the Greenford Works and while he was beset with the most complicated types of manufacturing and commercial problems, Perkin also carried on difficult and important researches in organic chemistry completely unrelated to coloring matters. Less than a year after the starting of the Greenford Works, he discovered that aminoacetic acid or 'glycocoll' could be obtained by heating bromacetic acid with ammonia. By 1860, together with his fellow worker, Duppa, he had discovered the relationship between tartaric, fumaric and maleic acids and had accomplished the synthesis of racemic acid from di-bromo-succinic acid (*D1, D2, D3, D7*).

About 1867 he commenced his famous researches on the action of acetic anhydride upon aromatic aldehydes, and this culminated in the classical method of synthesizing unsaturated acids by what is now known as the "Perkin Synthesis." Within a year, as a result of this work, Perkin had synthesized coumarin, the odor substance in tonkabean and had thus made the first synthetic perfume or flavor. Furthermore, it is interesting to note that the continuation of work along these particular lines some years later led to his great discovery of the synthesis of cinnamic acid from benzaldehyde, which made possible the first synthesis of indigo by Baeyer and Caro (*C1, C2, C3, C4, C25*).

During Perkin's manufacturing period, his research work was carried on in a laboratory, in a house just outside the Greenford factory. With the aid of his coworker, Church, he also carried on in this laboratory investigations on the structure of various dyestuffs and coloring matters *(B1, B2, B6, B8)*. Thus, like a juggler, Perkin kept three lines of work going on at the same time; the study of technical processes for manufacturing dyestuffs; the study of the theoretical

Figure 7
Perkin's father (1802-1865)

structure of dyestuffs, and organic synthesis.

After Perkin's retirement from business he had a new house built at Sudberry and converted the adjacent house in which he had previously been living into a laboratory. Here, almost up until the time of his death, he continued his researches. Here also in 1881 he first became interested in a certain physical property of some of the organic compounds which he had prepared, namely, their magnetic rotary power (*E1*). He further developed his ideas so that the examination of this particular property of organic compounds became an important tool in answering various questions of chemical constitution, and the remainder of Perkin's life, for some 25 years, was devoted to this phase of physical organic chemistry. Many scientists have indicated that this was the greatest of all of Perkin's work. Perkin's accomplishments in this difficult field are best summarized in a letter which Professor Bruehl, himself one of the pioneers in the application of optical methods for the determination of chemical constitutions, sent to Perkin in 1906 (*H11*):-

> **"Availing yourself of the marvelous discovery of your great countryman, Michael Faraday, you undertook to investigate the relations between the chemical composition of bodies and their magnetic circular polarization that is to say one of the general properties of all matter. Before you began work there was little, almost nothing, known of this subject, certainly nothing of practical use to the chemist. You created a new branch of science, taught us how; from the magnetic rotation, conclusions can be drawn as to the chemical structure of bodies, and showed that the magnetic rotation allows us to draw comprehensive and certain conclusions as to the chemical constitution of substances, just as we may from another general physical property, viz, refraction and dispersion. And by showing that both these physical methods of investigation lead to completely harmonious results, you did essential service to both the branches of study, and also to chemistry, which they are destined to serve."**

Perhaps the best summary of Perkin's scientific work as a whole is given by his friend and biographer, Meldola. In the latter's obituary of Perkin, he says (*H11*):—

> **"Reviewing Perkin's scientific work as a whole, its chief characteristic is its solidity. His mind was not of that order which readily entered into the region of speculation; he was a typical representative of that school of chemists to whom the conscientious accuracy of experimental facts is of primary importance—the school which has laid those solid foundations of chemical science upon which all super structures of theory must be erected. It is for this reason that it may be predicted with certainty that his work will live in the history of modern chemistry whatever changes in theoretical conceptions the future may have in store. He, himself, witnessed with the progress of the science radical changes in the views of chemists concerning the mechanism of the reactions or the nature of the compounds which he had discovered. With true philosophic spirit he accepted the evidence of other workers and welcomed the legitimate development of his own discoveries. Whatever modification of theory may have been rendered necessary by the accumulated labors of the great and ever-growing army of investigators which he lived to see following the tracks which he had been the first to tread, it may be safely asserted that his own early footprints have been, and always will be ineffaceable."**

Perkin's personal life was essentially uneventful. His devotion to science and to his family was so complete that beyond participating in the work of several scientific societies, he took no part in outside affairs.

Perkin married Jemima Harriet Lissett in 1859. Unfortunately, Jemima died in 1862, but she did give William Perkin two sons who became distinguished professors of chemistry. Four years after the death of his first wife, Perkin married a Polish girl, Alexandrine Caroline Mollwo. From

this marriage there was one son, Frederick, and four daughters.

Apparently, Perkin's three sons inherited their father's scientific curiosity and the work of two of them, William Henry and Arthur George, was at times concerned with textiles.

The son, William Henry, after going through City of London School and the Royal College of Chemistry, as did his father, studied under the great Von Baeyer and perfected a fine experimental skill in organic chemical research. At the University of Manchester he created a school of organic chemistry which received world-wide recognition. Interestingly enough, William Henry was the inventor of a durable flameproof finish for cotton called "non-flam," which was based on the precipitation of tin salts on the fabric. In 1912 he left Manchester for Oxford and founded there an even greater school of organic chemistry.

The second son, Arthur George, while not as famous as his elder brother, also became a skilled organic chemist, but most of his attention was devoted to dyestuff manufacturing and then to research on natural organic coloring matters at the University of Leeds. In 1916 Arthur George succeeded A G Green as professor of color chemistry and dyeing at the University of Leeds, and continued his textile researches until his health began to fail in 1937.

Perkin's retiring nature and lack of desire for publicity caused him to remain in comparative obscurity as far as the general public was concerned for most of his life. While some of his scientific colleagues saw that he received frequent recognition for his pure scientific work, his contemporary coworkers in the field of dyestuff manufacture and development did not always give him the recognition that was his due for founding the great dyestuff and organic chemical industry. In fact, an examination of the contemporary technical literature during the time of Perkin's active participation in dyestuff manufacture does raise some strong questions along these lines.

For example, the important book entitled "On Aniline and its Derivatives," by the German chemist, Reimann, published ten years after Perkin's discovery, certainly would not indicate to the casual reader Perkin's prime position in the development of the coal-tar industry. The first dyestuff discussed in this book is magenta, and mauve is given a secondary position. Finally, in this authoritative source the only statement about Perkin's work which is given in a chapter on aniline blue and violet is as follows,—"A violet, the first of all aniline colors was discovered by Messrs Perkin and Church." The writer goes on to discuss in great detail the work of Hofmann and others without any additional word of appreciation for Perkin's great part. The question is: Were the Germans, who had taken over the great work of Perkin, trying to build up their own role by giving main prominence to Hofmann, the German teacher, rather than to Perkin, the English student?

Figure 8
Perkin's brother (1831-1891)

Even Hofmann in his report on "Coloring Matters Derived From Coal Tars Shown at the French Exhibition, 1867," makes only brief mention of his own student's part in the founding of this industry; yet at that time, 11 years after Perkin's discovery, Hofmann points out how a great industry had already arisen based on the chemicals from coal tar, which not only has given us new colors but brought us also drugs, flavors and perfumes.

Finally, in William Crookes' monumental work, "A Practical Handbook of Dyeing and Calico Printing" (London, 1874), nothing is mentioned about Perkin's place in the founding of the synthetic dye industry, yet a number of chapters are devoted to the synthetic dyestuffs, their use and even methods of application (developed by Perkin). Crookes was Hofmann's first assistant at the time Perkin came under Hofmann, and he must have known Perkin and the importance of his discovery. The question again is: Was there a deliberate attempt to play down Perkin's importance? Could there have been jealousy on the part of the older Crookes? Or, did Perkin's inate modesty tend to keep down any favorable publicity?

Another question which often arises is: Why did England pay so little attention to the important discovery of their own Perkin and allow the Germans to take the lead in the dyestuff and organic chemical industries? Perhaps no clear-cut answer can ever be found, but as one English writer puts his complaint—

> **"Had the nation been far-seeing and wise, the industry would have flourished here (England) not merely for five or twenty years but permanently. Instead of this, Hofmann returned to Germany in 1865, Caro in 1867, Martius about the year 1870, Witt in the year 1879. Perkin retired in 1874 and the band of great discoverers had dwindled to two or three."**

Perhaps England's dominant place in the textile industry and its far-flung colonial possessions indicated no need for being concerned with the many things which could be made from the vile-smelling coal tar or with the chemists who worked with these "wastes" (*H29*).

Perkin did receive some recognition from the scientific societies with which he was associated. He was elected into the Royal Society in 1866 and in 1893 he became one of the vice presidents. The Chemical Society, which published most of his researches, made him president in 1883 (*G2*). Perkin's real recognition, as far as the world was concerned, however, came about only a year before his death, and this was on the occasion of the international celebration of the 50th anniversary of his discovery of the dyestuff "mauve" (*G6*).

An international committee for the celebration was set up and the 'giants' of the educational and scientific world of Europe and America were asked to serve. Among the American members were Leo Baekeland, Wilder Bancroft, Marston T Bogart, Nicholas Murray Butler, Chittenden of Yale, Charles Herty, J M Matthews, Ira Remsen, J Takamine, H W Wiley, Woodrow Wilson, as well as August Merz, Louis A Olney and Alan Claflin.

The main celebration was held in London at the Royal Institution on Thursday, July 26, 1906, with a fine banquet during the evening at the Hotel Metropole. Present at the celebration were representatives of the important scientific societies of England, France, Germany, Austria, Switzerland and the United States. Even representatives of the great German dyestuff companies were present to pay their respects to Perkin.

The spot chosen for the main celebration was of particular historical significance, for it was in 1825 at the Royal Institution that Michael Fara-

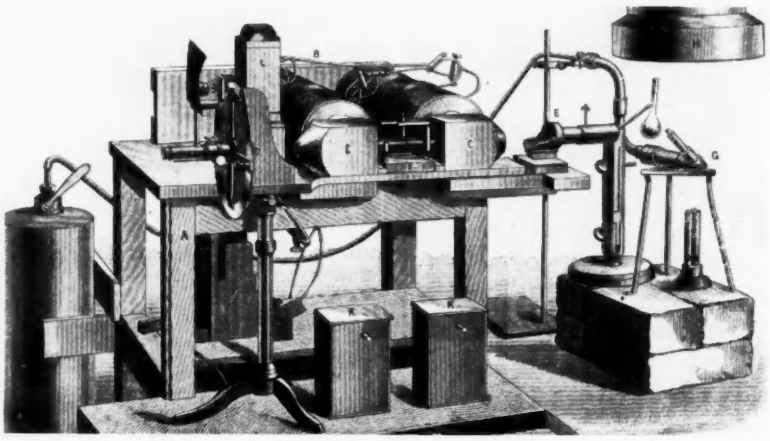


Figure 9
Apparatus used by Perkin in the determination of magnetic-optical rotations of organic compounds

day had first discovered benzene, the basic coal tar chemical and the starting point for Perkin's mauve. On a table before the distinguished gathering sat the original specimen of benzene which Faraday had discovered. During the celebration the now famous portrait of Perkin by Cope and the beautiful bust by Pomeroy were unveiled.

While it is particularly interesting to read the speeches which the German representatives delivered in paying homage to the greatness of England and Perkin just eight years before the outbreak of the First World War, the sentiments of all the speeches of that day were best summed up in the words of the American representative, Leo Baekeland:—

> "On behalf of the chemists in the United States of America I have come to congratulate you on the eminent services you have rendered to chemical science, and to chemical industry, for the greater benefit of mankind. On this day, when the whole scientific world remembers your brilliant and useful career, we express the sincere hope that your noble life may continue for many years more as an example to every chemist, and as an inspiration for further research work to the younger generation."

In the fall of the same year Perkin came to America to attend many meetings in his honor. These were held in New York, Boston, Washington and other cities. At the dinner in New York at Delmonico's on October 6. he was presented with the first "Perkin Medal," which has since been given annually to the American chemist who has "most distinguished himself by his services to applied chemistry" (*G12*).

The optimistic feeling of 50 years ago, in contrast to the fearfulness of today, was expressed in the words of Dr William Nichols on presenting the medal to Sir William (*H29*):—

> "You have seen the dawn of the golden age—the age of chemistry—that science which by synthesis will gather together the fragments and wastes of the other dynasties and build for the world a civilization which will last until the end."

For a final evaluation of Perkin's life and the story of the last moments of the great man, we return to Perkin's friend and coworker Meldola (*H11*):—

> "The influence which Perkin has exerted upon this generation is not to be measured solely by his achievements in pure and applied chemistry. His life was noble in its simplicity, and his single minded devotion to his work, combined with a character known to be religious in the highest and best sense of the term, will bequeath to posterity an enduring example of humility in the face of success which would have marred many men of smaller moral calibre. The financial success of his early manufacturing experience was turned to account simply as a means of advancing science, and no distinction which he ever gained throughout a career which culminated in 1906, when the King conferred upon him the honor of knighthood, and when the nations of the world assembled to render him homage, had the slightest influence upon the modesty and gentleness of his disposition. It was his personality that caused him to be revered in his domestic circle, and to be beloved by all who enjoyed the privilege of his friendship.
>
> ". . . In his general mode of life Perkin was a man of extreme frugality, robust and active to the last. To one of his retiring habits, the strain accompanying the Jubilee celebrations in 1906 and the subsequent ordeal of his American tour must have been considerable, but he bore all the excitement and fatigue without the least indication of discomfort. Literally, he died in harness; a few months previously he had read his last paper before the Chemical Society, and he was looking forward to being able to resume his research work quietly and uninterruptedly after the distractions of 1906. The illness which brought his noble and useful life to an end, which, in view of his activity, cannot but be regarded as premature, did not at first reveal any serious symptoms. The writer of this notice was with him a few hours before his death, and although he complained of suffering pain he spoke hopefully of his condition and anticipated being soon able to leave his room. The illness proved, however, to be more serious than he or his family were aware of; a sudden change for the worse occurred, and on July 14th, 1907, he passed away in perfect peace and in the full tide of his well won honor."

BIBLIOGRAPHY

EDITOR'S NOTE: On the following four pages appears what is believed to be the most complete bibliography on all aspects of Perkin's work. Perkin devoted most of his working life to pure organic and physical chemical research, and, during most of his life, he was best known to the scientific world for his work in organic chemistry, not for his work on dyestuffs.

Conceding that there may be omissions in this bibliography, the author has attempted to make it as complete as possible.

A. PATENTS GRANTED TO PERKIN ON DYESTUFFS AND DYEING

(1)	BP #1984, Aug 26, 1856	Covering mauve and other coal tar dyestuffs of similar constitution.
(2)	BP #1257, May, 1859	Mordanting and dyeing fabrics of cotton and other vegetable fibers. (Mordanting with lead acetate and fixing with ammonia or alkalis).
(3)	BP #2492, Nov 1, 1859	Manufacture of colouring matters (aniline dyes from toluidine, xylidine, cumidine, using "mercury perchloride" . . $HgCl_2$)
(4)	BP #2107, July 24, 1862	Improvements in printing and dyeing when aniline and analogous coal tar dyes are employed, also in preparing colouring matters.
(5)	BP #859, Apr 4, 1863	Manufacture of red and orange (naphthylamine azo dyes).
(6)	BP #2762, Nov 6, 1863	Manufacture of colouring matters suitable for dyeing and printing.
(7)	BP #2181, Sept 6, 1864	Preparing colouring matters for dyeing and printing. (Rosaniline dyes combined with brominated turpentine).
(8)	BP #1948, June 26, 1869	Improvement in the manufacture of colouring matter suitable for dyeing and printing. (Referring to anthraquinone in sulfonated state as a mordant dye . . . "oxanthracene," ie, anthraquinone). Alizarin.
(9)	BP #3318, Nov 17, 1869	Manufacture of colouring matter suitable for dyeing and printing. Alizarin.

B. PERKIN'S PUBLICATIONS ON DYESTUFFS AND INTERMEDIATES

(1)	*Proc Royal Soc* **8**, 48-49, 1856 (Perkin and A H Church)	On some new colouring matters.
(2)	*J Chem Soc* **9**, 1-8, 1857 (Perkin and A H Church)	On some new colouring matters, derivatives of dinitrobenzole, dinitronaphthaline, etc.
(3)	*Ibid* **9**, 8-15, 1857	Action of chloride of cyanogen on naphthalamine.
(4)	*Chem News* **3** (III), 346-354 (1861)* pr May 16, 1861**	On the colouring matter derived from coal tar (including Aniline Purple, rosein, fuchsine, bleu de paris, rosolic acid and many others).
(5)	*J Chem Soc* **14**, 230-235, 1862	On colouring matters derived from coal tar (referring to derivatives of aniline, naphthaline and pyrrhol bases).
(6)	*Ibid* **16**, 207-216, 1863 (Perkin and A H Church)	On some derivatives of naphthylamine.
(7)	*Proc Royal Soc* **12**, 713, 1863	Communication (abstract) on Mauve or Aniline Purple.
(8)	*Chem News* **7** (VII), 210 pr April 16, 1863 (Perkin and A H Church)	On some derivatives of naphthylamine.
(9)	*Ibid* **8** (VIII), 244-245 pr Nov 21, 1863	On Mauve or Aniline Purple (From *Proc Royal Soc* **12**, 713, 1863).
(10)	*Annalen der Chemie* **131**, 201-210; 1864	Ueber Anilinpurpur (Mauve). (On Aniline Purple or Mauve).
(11)	*J Chem Soc* **18**, 173-182, 1865	On the action of nascent hydrogen on azodinaphthyl diamine.
(12)	*Chem News* **18** (XVIII), 256-7 pr Nov 19, 1868	On the action of chloride of lime on aniline.
(13)	*J Chem Soc* **22**, 25-27, 1869	Note on the action of chloride of lime on aniline.
(14)	*Chem News* **19** (XIX), 181-2, 1869 pr April 16, 1869	On some new aniline dyes (Rosaniline derivatives).
(15)	*Ibid* **21** (XXI), 139-141 pr Mar 17, 1870	Artificial alizarin (Explaining the process covered by BP 1948, 1869).
(16)	*Ibid* **22**, 283-4 pr Dec 1, 1870	On some derivatives of anthracene.
(17)	*Ibid* **23**, 133-143, 1870 Transact	On artificial alizarin.
(18)	*Ibid* **22** (XXII): p 17-19 1870 (7/8) **29-33** " (7/15) 40-42 " (7/22) 53-54 " (7/29) **64-66** " (8/5) 79-82 " (8/12) 92-93 " (8/19) 100-101 " (8/26)	Cantor lectures delivered before the London Society of Arts "on the aniline- or coal-tar colors."
(19)	*Ibid* **22** (XXII), 37, July 22, 1870	Note on some new derivatives of anthracene (Discussing publications of Graebe and Liebermann in *Berichte* 636, 1870).
(20)	*Annalen* **158**, 315-9, 1871	Kuenstliches Alizarin (Artificial alizarin); abstracted from *Chem News* **23**, 133-143, 1870.
(21)	*Chem News* **24**, 13-22, 1871 Transact	On some derivatives of anthracene.
(22)	*J Prakt Chemie* (*NF*) 321-7, 1871	Ueber einige Derivative des Anthracens (translated abstr from the preced)
(23)	*Chem News* **24**, 226 pr Nov 2, 1871	On anthraflavic acid.
(24)	*Ibid* **25**, 284 pr June 6, 1871	Note on a secondary colouring matter produced in the preparation of alizarin.
(25)	*Ber d Deutschen Chem Ges* **5**, 996, 1872	Short report regarding anthraflavic acid.
(26)	*J Chem Soc* **26**, 19-23, 1873	On anthraflavic acid.
(27)	*Ibid* **26**, 425-433, 1873	On anthrapurpurine.
(28)	*J Prakt Chemie* (*NF*) **8**, 241-51	Ueber Anthrapurpurin (Translated abstract of the preced)
(29)	*Ber d Deutschen Chem Ges* **8**, 780, 1875	Short report on nitroalizarine.
(30)	*Ibid* **9**, 281, 1876	Short report on anthrapurpurine.
(31)	*J Chem Soc* **29**, 851-5, 1876/I	On the formation of anthrapurpurine.
(32)	*Chem News* **27**, 81 pr Feb 6, 1873	On anthrapurpurine.
(33)	*Ibid* **27**, 317 pr June 19, 1873	Note on the action of bromine on alizarin.
(34)	*J Chem Soc* **30**, 578-81, 1876/II	On acetyl and nitro derivatives of alizarin.
(35)	*Ibid* **31**, 209, 1877/I	Note on some new derivatives of anthracene.
(36)	*Chem News* **34**, 145, 1877 pr before the Brit Assn Glasgow Meeting Sect B	(See preceding reference).
(37)	*Dingler's Polytech J* **223**, 321-23, 1877	On the formation of alizarin and anthrapurpurine. (Report on Perkin's work).
(38)	*J Chem Soc* **35**, 717-32, 1879 Tr	On mauveine and allied colouring matter (Ref to BP # 1894 of Aug 26, 1856).
(39)	*Chem News* **37**, 110 pr March 7, 1878	Note on the action of ammonia on anthrapurpurine.
(40)	*J Soc Arts* **39**, 189, May 8 and 15, 1879	Paper read on the chemistry, history and technical application of coal tar colors.
(41)	*J Chem Soc* **37**, 546-554, 1880 Tr	On some products of the oxidation of paratoluidine.
(42)	*Ibid* **37**, 554-559, 1880 Tr	On dibromoanthraquinone and the coloring matter derived thereof.
(43)	*Chem News* **41**, 269 pr June 3, 1880	On some products of the oxidation of p-toluidine.
(44)	*Ibid* **42**, 267 pr Nov 18, 1880	Account given on synthesis of artificial indigo (Adolph Bayer method.)
(45)	*Ibid* **46**, 300 pr Dec 21, 1882	Preliminary note on some diazoderivatives of nitrobenzylguanide.
(46)	*J Chem Soc* **43**, 111-2, 1883 T	(See preceding reference)
(47)	*Ibid*, Proc 1893, 137-139	Account on the progress in coal tar industry (contained in the Hofmann Memorial address 1896 Tr 575-732) (See following reference).
(48)	*Ibid* **69**, 596-637, 1896 T	The origin of the coal tar industry and the contribution of Hofmann and his pupils. (Part of the Hofmann Memorial Lecture forms a contribution of Perkin on pages 596-637).

*The old edition of *Chem News* is marked with an arabic and in parenthesis a roman number; the newer edition with arabic numbers for each volume only.
**pr means paper read before Chemical Society (London).

C. PERKIN'S PUBLICATIONS ON COUMARINE, CINNAMIC ACID, SALICYLIC ACID, DERIVATIVES AND RELATED WORK

(1)	*J Chem Soc* **20**, 418-432, 1867	On some new derivatives of the hydride of salicyl.
(2)	*Chem News* **15** (XV), 326 pr June 20, 1867	On some new derivatives of the hydride of salicyl.
(3)	*Ibid* **16** (XVI), 253 pr Nov 7, 1867	On the action of acetic anhydride upon the hydrides of salicyl, ethyl salicyl, etc.
(4)	*Ibid* 16 (XVI), 298-9 pr Dec 5, 1867	On the artificial production of coumarine and formation of its homologues.
(5)	*J Chem Soc* **21**, 53-63, 1868	On the artificial production of coumarine and formation of its homologues.
(6)	*Ibid* **21**, 181-6, 1868	On the hydride of aceto salicyl.
(7)	*Ibid* **21**, 472-77, 1868	On the hydride of butyrosalicyl and butyric coumaric acid.
(8)	*Chem News* **21**, 122-7, 1868 Tr	On some new benzylic derivatives of the salicylic series.
(9)	*Ibid* **17** (XVII), 128 pr Feb 6, 1868	On some new benzylic derivatives of the alicylic series.
(10)	*Ibid* **17** (XVII), 128 pr March 5, 1868	On the hydride of acetosalicyl.
(11)	*Ibid* **18** (XVIII), 110 pr Brit Assoc Norwich Meeting Sect B on Sept 4, 1868	Note on the preparation of some anhydrides.
(12)	*Ibid* **18** (XVIII), 233-4 pr Nov 5, 1868	On the hydride of butyro salicyl and butyric coumaric acid.
(13)	*J Chem Soc* **22**, 191-2, 1869	Note on coumaric acid.
(14)	*Chem News* **22**, 308-310, 1870 pr Dec 15, 1870	On some new derivatives of couramine.
(15)	*Chem News* **21** (XXI), 247 pr May 19, 1870	On some bromine derivatives of coumarine.
(16)	*Ibid* **22** (XXII), Aug 19, 1870	Note on some new derivatives of coumarine.
(17)	*J Chem Soc* **23**, 368-71, 1870	On some new bromine derivatives of coumarine.
(18)	*Ibid* **24**, 37-55, 1871	On some new derivatives of coumarine (ie, halogenated and sulfo compounds).
(19)	*Annalen der Chemie* **157**, 115-9, 1871	Ueber einige neue bromhaltige Derivate des Coumarins (On some new bromine derivatives of coumarine).
(20)	*Ber d Deutschen Chem Ges* **7**, 1653, 1874	Short report on propiono coumarine.
(21)	*Ibid* **8**, 1599, 1875	Preliminary report on coumarine, coumaric and similar acids.
(22)	*J Chem Soc* **28**, 10-15, 1875	On propionic coumarine and its derivatives.
(23)	*Ibid* **31**, 388-427, 1877/I	On the formation of coumarine and of cinnamic acid and of other analogous acids from aromatic aldehydes.
(24)	*Chem News* **35**, 61-2 pr Feb 1, 1877	(Same title as preceding reference).
(25)	*J Chem Soc* **32**, 660-674, 1877/II	On some hydrocarbons obtained from the homologues of cinnamic acid; and on anethol and its homologues.
(26)	*Chem News* **36**, 211 pr, Nov 1, 1877	(Same title as preceding reference).
(27)	*Ibid* **35**, 272-3 pr June 21, 1877	A note on anethol and its homologues (Referring to pages 409-414 as part of *J Chem Soc* **31**, 388-427, 1877/I above).
(28)	*J Chem Soc* **35**, 136-147, 1879 Tr	On the action of isobutyric anhydride on the aromatic aldehydes.

(29) *Ibid* **39**, 409-452, 1881 Tr — On the isomeric acids obtained from coumarine and the ethers of hydrid of salicyl.

(30) *Chem News* **43**, 287 pr June 16, 1881 — (Same title as preceding reference).

(31) *J Chem Soc* **55**, 549-51, 1889 Tr. (Also Proc 1889, 105-6) — Observations on the melting points of some salicylic anisic compounds.

D. OTHER REACTIONS AND SYNTHESES

(1) *J Chem Soc* **11**, 22-30, 1859 (Perkin and B F Duppa) — Action of bromine on acetic acid.

(2) *Ibid* **12**, 1-7, 1860 (Perkin and B F Duppa) — Action of bromine on acetic acid.

(3) *Chem News* **1** (I), 244 (Perkin and B F Duppa) pr on Apr 19, 1860 — On the artificial production of tartaric acid.

(4) *Ibid* **3** (III), 81-83, 1861 — On the molecular constitution of glycolic and lactic acids.

(5) *J Chem Soc* **13**, 1-8, 1861 (Perkin and B F Duppa) — On iodoacetic acid (Referring to *Philosophical Magazine*, July 1860).

(6) *Ibid* **13**, 9-12, 1861 (Perkin and B F Duppa) — Action of pentachloride of phosphorus on tartaric acid (Referring to *Philosophical Magazine*, 1860).

(7) *Ibid* **13**, 102-106, 1861 — On bibromosuccinic acid and the artificial production of tartaric acid.

(8) *Ibid* **16**, 198-200, 1863 — Note on chloromaleic acid from tartaric acid.

(9) *Chem News* **7** (VII), 211 pr Apr 16, 1863 — On chloromaleic acid obtained from tartaric acid.

(10) *J Chem Soc* **18**, 9, 1865 — Note on the artificial formation of pyridine from naphthalene.

(11) *Ibid* **18**, 92-94, 1865 — Note on a new bromine derivative of camphor.

(12) *Chem News* **11** (XI), 41 pr Jan 19, 1865 — Short account of the artificial formation of pyridine.

(13) *Ibid* **11** (XI), 176 pr Apr 6, 1865 — Note on a new bromine derivative of camphor.

(14) *Ibid* **15** (XV), 4 pr Dec 20, 1866 — On the basicity of tartaric acid.

(15) *J Chem Soc* **20**, 136-160, 1867 — On the basicity of tartaric acid (Also reported in *Chem Zentralblatt*, 593-603 (1867).

(16) *Ibid* **21**, 197-210, 1868 (Perkin and B F Duppa) — On the constitution of glyoxylic acid.

(17) *Chem News* **17** (XVII), 173-4, pr Apr 2, 1868 — On the constitution of glyoxylic acid.

(18) *J Chem Soc* **22**, 260-262, 1869 — On Regnault's chlorinated chloride of methyl.

(19) *Chem News* **31**, 65 pr Feb 4, 1875 — On dibromo acetic acid and glyoxylic acid.

(20) *J Chem Soc* **32**, 90-103, 1877/II — On dibromo acetic acid and glyoxylic acid.

(21) *Ibid* **33**, 211-15, 1878 Tr — On some new derivatives of anisoil (Anisol).

(22) *Chem News* **37**, 109 pr Mar 7, 1878 — On some derivatives of anisoil.

(23) *Ibid* **39**, 39 pr Jan 16, 1879 — On the action of isobutyric anyhydride on the aromatic alrehyde.

(24) *Ibid* **37**, 721-7, 1880 Tr (Perkin and W R Hodgkinson) — On the action of benzylchloride on phenylacetate.

(25) *J Chem Soc* **39**, 554-562, 1881 Tr — On citraconic and mesaconic ethers and maleic and fumaric acids

(26) *Chem News* **44**, 236 pr Nov 3, 1881 — (Same title as preceding reference).

(27) *J Chem Soc* **41**, 268-70, 1882 Tr — On the action of acetyl chloride on fumaric acid.

(28) *Chem News* **45**, 160 pr Apr 6, 1882 — (Same title as preceding reference).

(29) *Ibid* **46**, 275 pr Dec 7, 1882 — Note on the preparation of diphenylene-ketone ether.

(30) *Ber d Deutschen Chem Ges* **15**, 1072-74, 1882 — Ueber die Einwirkung von Acetylchlorid auf Fumarsaeure (On the action of acetylchloride on fumaric acid).

(31) *J Chem Soc* **43**, 35, 1883 Tr — Note on the preparation of diphenylene ketone oxide.

(32) *Ibid* **49**, 317-328, 1886 Tr (Proc 1886, 165-6) — The formation of acids from aldehydes by the action of anhydrides and salts and the formation of ketones from the compounds resulting from the union of anhydrides and salts.

(33) *Chem News* **53**, 128 pr March 4, 1886 — (Same title as preceding reference).

(34) *J Chem Soc* **55**, 546-549, 1889 Tr (Proc 1889, 106) — The action of the chlorides of propionyl and butyryl on phenol.

(35) *Ibid* **83**, 1217-63, 1903 Tr (Proc 1900, 204-5) — The action of nitric acid on dimethylacetoacetate.

E. MAGNETIC ROTATION POLARIZATION

(1) *J Chem Soc* **41**, 330-333, 1882 Tr — On rotary polarisation by chemical substances under magnetic influence.

(2) *Chem News* **45**, 230 pr May 18, 1882 — (Same title as preceding reference).

(3) *Ber d Deutschen Chem Ges* **15**, 1363-1368, 1882 — Ueber circular Polarisation durch chemische Koerper unter dem Einfluss des Magneten (On rotary polarisation by chemical substances under magnetic influence.)

(4) *J Chem Soc* **45**, 421-580, 1884 Tr — On the magnetic rotary polarisation of compounds in relation to their chemical constitution with observations on the preparation and relative densities of the bodies examined.

(5) *Chem News* **45**, 230 pr May 18, 1882 — On rotary polarisation by chemical substances under magnetic influence.

(6) *J Prakt Chemie* **31**, 481-513, 1885; **32**, 523-622, 1886 — Ueber die magnetische circular-polarisation der verbindungen im verhaeltnis zu deren chemischen Constitution mit Bemerkungen ueber die Darstellung und spezifischen Gewichte der untersuchten Koerper (See title of (4) above.)

(7) *Chem News* **49**, 284-5 pr June 19, 1884 — On the magnetic rotary polarisation of chemical compounds in relation to their composition with observations on the preparation and densities of the bodies examined.

(8) *Ibid* **53**, 105-6 pr Feb 18, 1886 — The constitution of undecylenic acid as indicated by its magnetic rotation and on the magnetic rotation, etc, of mono- and di-allylacetic acids and ethylic di-allyl malonate.

(9) *J Chem Soc* **49**, 205-14, 1886 Tr (Abst in Proc 1886, 153-5) — On the constitution of undecylenic acid as indicated by its magnetic rotation and on the magnetic rotation, etc, of mono- and di-allyl acetic acids and of ethyl di-allyl malonate.

(10) *Ibid* **49**, 777-90, 1886 Tr — On the magnetic rotation of mixtures of water with some of the acids of the fatty series with alcohol, and with sulfuric acid and observations on water of crystallization.

(11) *Chem News* **54**, 203, 1886 — (Same title as preceding reference).

(12) *J Chem Soc* **51**, 362-371, 1887 Tr (Proc 1887, 29) — On tartaric and racemic acids and the magnetic rotation of their ethereal salts.

(13) *Ibid* **51**, 808-819, 1887 Tr (Proc 1887, 82-4) — On the magnetic rotation and densities of chloral, chloral hydrate and hydrated aldehyde.

(14) *Ibid*, Proc 1887, 98-9 — The magnetic rotatory power of the ethyl salts of maleic and citraconic acids and their isomers.

(15) *Chem News* **55**, 113 pr March 3, 1887 — Tartaric and racemic acids and the magnetic rotatory power of their ethyl salts.

(16) *Ibid* **55**, 269 pr June 2, 1887 — The magnetic rotation produced by chloral, chloral hydrate and hydrated aldehyde.

(17) *Ibid* **56**, 21 pr June 16, 1887 — The magnetic rotatory power of the ethyl salts of maleic and citraconic acids and their isomers.

(18) *J Chem Soc* **53**, 561-602, 1888 Tr — On the magnetic rotatory power of some of the saturated and unsaturated bibasic acids and their derivatives, also of mesityl oxide.

(19) *Ibid* **53**, 695-713, 1888 Tr (Proc 1888, 75) — Chlorofumaric and chloromaleic acids and the magnetic rotatory power of some of their derivatives.

(20) *Chem News* **58**, 21 pr June 21, 1888 — Chlorofumaric and chloromaleic acids and their rotatory powers.

(21) *J Chem Soc* **55**, 680-749, 1889 Tr (Proc 1889, 83-86) — The magnetic rotatory power of nitrogen compounds also of hydrochloric, hydrobromic and hydroiodic acids and of some of the salts of ammonia.

(22) *Ibid* **55**, 750, 1889 Tr — On the correspondence between the magnetic rotation and dispersion of light by compounds containing nitrogen.

(23) *Ibid*, Proc 1889, 114-5 (Perkin and J H Gladstone) — The correspondence between the magnetic rotation and the refraction and dispersion of light by compounds containing nitrogen.

(24) *Ibid*, Proc 1889, 130-2 — Additional observations on the magnetic rotation of nitric acid and of hydrogen and ammonium chlorides, bromides and in solution.

(25) *Chem News* **60**, 253-4 pr Nov 7, 1889 — (Same title as preceding reference).

(26) *Ibid* **59**, 247-8 pr May 16, 1889 — The magnetic rotation of nitrogen compounds.

(27) *J Chem Soc*, Proc 1890, 141-5 — The magnetic rotation of saline solutions. (Ref to part of *J Chem Soc* **55**, 680-749, 1889 Tr above.)

(28) *Chem News* **62**, 255-6 pr Nov 6, 1890 — (Same title as preceding reference).

(29) *J Chem Soc*, Proc 1891, 115-6 — The refractive power of certain organic compounds at different temperatures.

(30) *Chem News* **64**, 19-20 pr June 18, 1891 — (Same title as preceding reference.)

(31) *J Chem Soc* **61**, 287-310, 1892 Tr — On the refractive power of certain organic compounds at different temperatures.

(32) *Ibid* **59**, 981-90, 1891 Tr (Proc 1891, 25-6) — The magnetic rotatory power of solutions of ammonium and sodium salts of some of the fatty acids.

(33) *Ibid* **61**, 800-864, 1892 Tr (Proc 1892, 100-101) — The magnetic rotation of compounds, supposed to contain acetyl or to be of ketonic origin.

(34) *Chem News* **65**, 284-5 pr May 19, 1892 — (Same title as preceding reference.)

(35) *Ibid* **66**, 277 pr Nov 17, 1892 — The magnetic rotation of sulfuric and nitric acids and of their aqueous solutions; also of solutions of sodium sulfate and lithium nitrite.

(36) *J Chem Soc* **63**, 57-75, 1893 Tr (Also Proc 1892, 161-2) — (Same title as preceding reference.)

(37) *Ibid* **63**, 488-91, 1893 Tr (Proc 1893, 52) — The magnetic rotation and refractive power of ethylene oxide.

(38) *Chem News* **67**, 143 pr Mar 2, 1893 — (Same title as preceding reference.)

(39) *Ibid* **68**, 302 pr Dec 7, 1893 — The magnetic rotation of hydrogen chloride in different solvents and also of sodium chloride and of chlorine.

(40) *J Chem Soc* **65**, 20-28, 1894 Tr (Also Proc 1893, 244) — (Same title as preceding reference.)

(41) *Ibid* **65**, 402-432, 1894 Tr (Proc 1894, 81-84) — The magnetic rotation of some of the derivatives of fatty acids containing halogens, also of acetic and propionic acids, phosgene and ethylic carbonate.

(42) *Chem News* **69**, 224-5 pr April 19, 1894 — (Same title as preceding reference.)

(43) *J Chem Soc* **65**, 818-828, 1894 Tr — The magnetic rotation of compounds supposed to contain acetyl or to be of ketonic origin. (Continuation of work of same title in *J Chem Soc* **61**, 800-864, 1892 Tr.)

(44) *Ibid* **69**, 1025-1257, 1896 Tr (Proc 1896, 122-5) — On magnetic rotatory power especially of aromatic compounds.

(45) *Chem News* **73**, 300 pr June 4, 1896 — (Same title as preceding reference.)

(46) *J Chem Soc*, Proc 1895, 199-200 — The influence of temperature on refractive power and on the refraction equivalent of acetylacetone and of o- and p-toluidine.

(47) *Chem News* **72**, 288 pr Nov 21, 1895 — (Same title as preceding reference.)

(48) *Ibid* **71**, 123 pr Feb 21, 1895 — On the magnetic rotation of some unsaturated hydrocarbons.

(49) *J Chem Soc* **67**, 255-64, 1895 Tr (Proc 1895, 35-6) — The magnetic rotation of some unsaturated hydrocarbons.

(50) *Ibid*, Proc 1899, 237-8 — On the refractive and magnetic rotary powers of some aromatic hydrocarbons and on the refractive powers of mixtures.

(51) *Ibid* **77**, 267-294, 1900 Tr — The refractive and magnetic rotatory power of some benzenoid hydrocarbons. The refractive power of mixtures. An improved Spectrometer Scale Reader.

(52) *Ibid* **81**, 177-191, 1902 Tr (Proc 1901, 256) — The magnetic rotation of some polyhydric alcohols, hexoses, saccharobioses and disaccharoses.

(53) *Ibid* **81**, 292-318, 1902 Tr (Proc 1902, 28-9) — Magnetic rotation of ring compounds. Camphors, limonene, carvene, pinene and some of their derivatives.

(54) *Ibid* **87**, 1491-1493, 1905 Tr — Densities, magnetic rotations and refractive powers of 1-1-dimethyl-hexahydrobenzene. (Contained in an article of Crossley and Renouf on p 1487-1503 of this issue.)

(55) *Ibid* **88**, 33-37, 1906 Tr — Densities, magnetic rotations and refractive powers of laurolene, di-hydrolaurolene, isolaurolene and di-hydroisolaurolene. (Contained in an article of Crossley and Renouf on p 26-46 of this issue.)

(56) *Ibid* **89**, 608-18, 1906 Tr (Proc 1906, 100-1) — An improved apparatus for measuring magnetic rotations and obtaining a powerful sodium light.

(57) *Ibid* **89**, 849-856, 1906 Tr — Densities, magnetic rotations and refractive powers of menthadiene, terpineol and dipentene. (Contained in an article of F W Kay and H W Perkin, Jr, in same issue, p 839-856.)

(58) *Ibid* **91**, 806-16, 1907 Tr (Proc 1907, 110-12) — The magnetic rotation of hexatriene and its relationship to benzene and other aromatic compounds, also its refractive power.

F. MISCELLANEOUS WRITINGS

(1) *Chem News* **17** (XVII) 260-1 pr May 21, 1868 — Observations upon the combining of carbon.

(2) *Ibid* **40**, 308 pr Dec 8, 1879 — On the analysis of organic bodies containing nitrogen.

(3) *Ibid* **41**, 191 pr Apr 15, 1880 — On the analysis of organic bodies containing nitrogen (Continuation of preceding reference).

(4) *J Chem Soc* **37**, 121-4, 1880 Tr; **37**, 457-461, 1880 Tr — (Same title as preceding references).

(5) *Ibid* **41**, 363-7, 1881 Tr — Some observations on the luminous incomplete combustion of ether and other organic bodies.

(6) *Ber d Deutschen Chem Ges* **15**, 2155-9, 1882 — Einige Beobachtungen ueber die leuchtende unvollkommene Verbrennung des Aethers und anderer organischer Substanzen (English title title from preceding reference).

(7) *Chem News* **45**, 105 pr Mar 2, 1882 — (Same title as preceding reference).

(8) *J Chem Soc* **53**, 689-94, 1888 Tr (Proc 1888, 74) — On an apparatus for maintaining a constant pressure when distilling under reduced pressure.

(9) *Chem News* **57**, 247-8 pr June 7, 1888 — (Same title as preceding reference).

(10) *Ibid* **70**, 154-5, 169-70, 183-5, 1894 — The action of light upon dyed colors (Report of Committee headed by Thorpe and composed of Perkin and other scientists).

(11) *J Chem Soc* **83**, 1367-71, 1903 Tr (Proc 1903, 239) — Simplification of Zeisel's method of methoxyl- and ethoxyl determination.

G. SPEECHES, CEREMONIES, AWARDS DURING PERKIN'S LIFETIME

(1) *Proc Royal Soc* **29**, 430-1, 1879 — Award of a Royal Medal from the society.

(2) *J Chem Soc* **45**, 209-224, 1884 Tr — Presidential address to the Chemical Society, 1884.

(3) *Ibid* **47**, 300-346, 1885 Tr — Presidential address to the Chemical Society, 1885.

(4) *Proc Royal Soc* **46**, 458-9, 1889 — Award of the Davy Medal for Perkin's researches on magnetic rotation in relation to chemical constitution.

(5) *J Chem Soc*, Proc **1906**, 247-9 — Address of the Chemical Society to congratulate Perkin on the 50th anniversary of his first work on coal tar colors.

(6) *Ibid*, Proc 1907, 53 — Decision of the Chemical Society to place the marble bust of Perkin in the rooms of the society.

(7) *J Soc Dyers Col* **22**, 292-297, 1906 — "Coal Tar Jubilee" presentation to Perkin of medals and addresses in presence of prominent British and foreign scientists and description of allocutions and ceremonies. Personal presentation of the Hofmann medal by Emil Fischer and of the Lavoisier medal by Haller, also dedication of a marble bust.

(8) *Ibid* **22**, 267-268, 1906 — Addresses of the Society of Dyers and Colourists to Perkin on memorial meeting on July 26, 27, 1906.

(9) *Z Angewandte Chemie* **19**, 1282, 1369, 1745; 1906 — Report on the Jubilee on July 26, 27, 1906.

(10) *Chemiker Zeitung Coethen* 729, 739, 1906 — Report on the Jubilee on July 26, 27, 1906.

(11) *School of Mines, Quarterly* **28** (Columbia University), NY, p 239-242, 1907 — Sir H W Perkin (Speech of presentation by Charles F Chandler in connection with conferring the degree of Doctor of Science by Columbia University).

(12) *Textile Mfrs J*, 20-5, October 13, 1906 — "The Perkin's Jubilee"—Detailed report on celebration in New York in honor of Perkin as founder of the coal-tar industry.

(13) *J Soc Dyers Col* **23**, 104-5, 1907 — Address on accepting the presidency of the society.

H. OBITUARIES AND REFERENCES TO PERKIN'S WORK AFTER HIS DEATH

(1) *New York Times*, July 15, 1907, p 7 — Sir W H Perkin dead; discoverer of aniline dyes was feted in this country last year. Reference library founded in the Chemists' Club. Reference to degree of LLD by Johns Hopkins University.

(2) *London Times*, July 15, 1907, p 6 — Obituary.

(3) *New York Herald* (European Edition, Paris), July 15, 1907, p 1 — Short report on death of Perkin.

(4) *Ber d Deutschen Chem Ges* **40**, 3391-2, 1907 — Short obituary report on death of Perkin given in the society by Pres. Gabriel mentioning honorary membership.

(5) *Comptes Rendus* (Paris) **145**, 153, 1907 — Obituary and short report on Perkin's work presented by Haller.

(6) *The Dyer & Calico Printer* **27**, 121, July 20, 1907 — Short note on the death of Sir W H Perkin.

(7) *Revue General des Matieres Colorantes* **11**, 256 of Aug, 1907 — Short note, referring to Meldola's Biography in 1907.

(8) *J Soc Dyers Col* **23**, 208, 1907 — Obituary.

(9) *Z Angewandte Chemie* **20**, 1259 — Short obituary.

(10) *Chemiker Zeitung Coethen* 717, 1907 — Short obituary.

(11) *J Chem Soc* **93**, 2214-2257, 1908 (Meldola) — Detailed biography and obituary on Perkin.

(12) *Manchester Lit & Phil Soc Memoirs and Proceedings* **52**, *Proc* XLIII-XLVII, Manchester 1908 (Signed J F T—probably Jocelyn F Thorpe) — Sir H W Perkin — Commemorating Perkin as an honorary member of this society, elected April 26, 1892.

(13) *Proc Royal Soc* **80A** pXXXVIII - LIX, London 1908 (Meldola) — Obituary.

(14) *J Soc Dyers Col* **24**, 3, 1908 — First publication of the Perkin Medal. Conditions and design.

(15) *J Am Chem Soc* **30**, 38-46, 1908 — Short obituary and first presentation of the American Perkin Medal to Herreshoff.

(16) *Chemistry & Industry* **48**, 100812, 1909 Signed "R R" — Obituary (with portrait).

(17) *Ber d Deutschen Chem Ges* **44**, p911-956, 1911 (Meldola) — Detailed obituary with portrait.

(18) *J Soc Dyers Col* 410, 1930 — Note on Memorial Plaque with Perkin's head, profile (life-size) presented by his old students and colleagues to the Universities of Oxford and Manchester and to the Chemical Society of London.

(19) *Ind Eng Chem* **25**, 229, 1933 — Perkin Medal Award of the American Section of the Society of Chemical Industry in NY, 1906 to Perkin himself, and since 1908 each year to another scientist.

(20) *The Chemist* **9**, 517-22 (Easton, 1932) (Lucie E Weart) — The First Synthetic Dye. The story of W H Perkin, one of the fathers of modern synthetic chemistry.

(21) *Current Science* **6**, 460-71 (Bangalore, 1938) — W H Perkin.

(22) *Boletin de la Sociedad Quimica del Peru* **4**, 243-252 (Bol Lima, 1938) (Jose Levy) — Sir W H Perkin. (Commemorating the 100th anniversary of his birth on March 12, 1838).

(23) *London Journal Chemistry and Industry* **57** (Soc of Chemical Industry), 1137-1142, 1938 (Herbert Levinstein) — Sir W H Perkin's adventures and what has come of it. (Referring to Perkin's centenary in 1938).

(24) *J Soc Dyers Col* **54**, 116, 1938 — Note on W H Perkin at the centenary of his birth.

(25) *Ibid* **55**, 116, 1939 — Note on a memorial of W H Perkin unveiled on Aug 12, 1939, in Sudbury.

(26) *Ibid* **66**, 347, 1950 — The Council of the society has set up a committee for the Perkin centenary 1956 as the date of the invention of Mauve in 1856.

(27)	*J Chem Ed* (Van Klooster) **28**, 359-63, 1951	Bunsen, Berthelot and Perkin.
(28)	*Am Dyestuff Reptr* **42**, 378, 1953	Nomination of Centennial Committee of the AATCC for 1956.
(29)	*Ibid* **43**, 517, 1954 (S M Edelstein)	Biography.

I. SPECIAL REFERENCES REGARDING THE PERKIN REACTION

(1)	*Monatshefte* **34**, 649-658 (Meyer and Beer)	Ueber die Perkin'sche Reaction.
(2)	*Am Chem J* **50**, 411-4, 1916 (Michael)	The Perkin reaction (Discussion of the above article).
(3)	*Bull Soc Chim* **19**, 287-90 1916 (Reich and Chaskelis)	Perkin's Reaction, a new method for the preparation of substituted cinnamic acid (*Chem Abst* **10**, 2873[9]).
(4)	*Gazz Chim Italiana* **46**, I 77-103, 1916 (Bakunin and Fisceman)	The mechanism of the Perkin Reaction.
(5)	*Ber d Deutschen Chemischen Ges* **51**, 1059-74, 1918 (Schaarschmidt et al)	Die Isovaleriansäure und ihr abweichendes Verhalten bei der Perkin'schen Synthese, (Isovalerianic acid and its peculiar behavior in the Perkin Synthesis).
(6)	*Bull Chem Soc Japan* **2**, 20-6, 1927 (Ogawa) (*Chem Abst* **21**, 1257/8)	Application of the Perkin Reaction to phenolic aldehydes.
(7)	*J Am Chem Soc* **50**, 3333-4, 1928 (Bacharach and Brogan)	Action of pyridine as a catalyst in Perkin's Synthesis of Cinnamic acid.
(8)	*Helvetica Chimica Acta* **11**, 977-1003, 1928 (Kalnin)	The mechanism of the Perkin Synthesis.
(9)	*Ber d Deutschen Chem Ges* **64 B**, 2347-52, 1931 (Kuhn and Ishikawa)	Zur Kenntnis der Perkin'schen Synthese.
(10)	*Ibid* **64 B**, 2935-1931 (Kalnin)	Zur Kenntnis der Perkin'schen Synthese.
(11)	*Annalen* **491**, 251-65, 1931 (Mueller)	Zur Kenntnis der Perkin'schen Synthese.
(12)	*J Am Chem Soc* **55**, 275-83, 1933 (Hurd and Thomas)	Interaction of ketene with aromatic aldehydes and its bearing on the Perkin Reaction.
(13)	*Proc Iowa Acad Sci* **38**, 171, 1931 (Raiford et al) (*Chem Abst* **27**, 1875[8])	Further observations on the behavior of vanillin substitution products (a) the Perkin Reaction.
(14)	*J Gen Chem USSR* **2**, 814-20, 1932 (Brodskii) (*Chem Abst* **27**, 2680[8])	Mechanism of Perkin's Reaction.
(15)	*Rend Accad Sci (Napoli)*, 20-22, 1933 (Bakunin) (*Chem Abst* **28**, 128[9])	The Mechanism of the Perkin-Ogliaroro Synthesis.
(16)	*Sci Reports Tokyo* **1**, 289-96, 1934 (Ishikawa) (*Chem Abst* **28**, 2697[8])	Perkin's Reaction (I) First phase of the Perkin's reaction.
(17)	*Monatshefte* **64**, 399-414, 1934 (Boeck et al)	Ueber die Perkin'sche Zimmtsaure Synthese (The Perkin Synthesis of cinnamic acid).
(18)	*Annalen* **515**, 97-112, 1935 (Mueller et al)	Die Perkin'sche Synthese.
(19)	*Sci Reports Tokyo* **2**, 257-65, 1935 (Kato) (*Chem Abst* **30**, 458[9])	Perkin's Reaction (III) Condensation of acid chlorides with Benzaldehyde.
(20)	*Gazz Chim Italiana* **65**, 1145-61, 1935 (Bakunin and Peccerillo) (*Chem Abst* **30**, 5200-1)	The Mechanism of the Perkin-Ogliaroro Synthesis.
(21)	*Ber d Deutschen Chem Ges* **69 B**, 2843, 1936 (Kalnins)	Ueber die Enolform des Saureanhydrids in der Perkin'schen Synthese (The enolic character of the acid anhydride in the Perkin Synthesis).
(22)	*J Appl Chem USSR* (Isagulyants) (*Chem Abst* **33**, 1696-7)	The chemism of Perkin's Reaction. New method of preparation of coumarine and its application on a large scale.
(23)	*J Am Chem Soc* **61**, 786-92, 1939 (Breslow and Hauser)	Condensation brought about by bases. (V) The condensation of the anhydride with the aldehyde in the Perkin Synthesis.
(24)	*J Gen Chem USSR* (Brodskii) (*Chem Abst* **33**, 4589[9])	Mechanism of the Perkin Reaction. (III) Mechanism of the reaction of formation of cinnamic acid.
(25)	*Ber d Deutschen Chem Ges* **72 B**, 1064-71, 1939 (Lock and Ba er)	Zur Kenntnis der Perkin'schen Zimmtsaure-Synthese (Synthesis of cinnamic acid).
(26)	*J Am Chem Soc* **62**, 593-7, 1940 (Hauser and Breslow)	Condensation brought about by bases (IX) The relationship between the Claisen—and Perkin types of condensation.
(27)	"Organic Reactions," Edited by Roger Adams, 1942 Pages 210-265	Perkin Reaction and related reactions.
(28)	*J Soc Dyers Col* **59**, 196-8, 1943 (Davis and Hodgson)	The mechanism of formation of leucotriphenylmethane dyes and an analogy in the Perkin Reaction.
(29)	*J Am Chem Soc* **67**, 1432-5, 1945 (Schwenk and Papa)	Cycloalkene acetic acids in the Perkin Reaction.
(30)	*J Org Chem* **12**, 547-50, 1947 (Utermohlen and Wallace)	Removal of acetic acid as a variable in the Perkin Reaction.
(31)	*J Am Chem Soc* **69**, 3022-3, 1947 (Schwenk and Papa)	Alpha- aryloxy- and alpha-aryl thiol—cinnamic acids.
(32)	*Rec Trav Chim des Pays Bas* **68**, 566-72, 1949 (Polya and Tardrew) (*Chem Abst* **44**, 1433i)	The use of diacetimide in the Perkin Recation.
(33)	*J Pharm Soc Japan* 1949 (Mizuno) (*Chem Abst* **44**, 1497g)	Salicylaldehyde in Perkin's Reaction (Ref to synthetic procedures for coumarin).
(34)	*J Chem Ed* **27**, 210-1, 1950 (Buckles)	The Use of the Perkin Reaction in organic laboratory classes.
(35)	US Pat 2,503,296 (Schering Corp-Schwenk and Papa—April 11, 1950)	Iodinated hydroxy aryl-aryloxy aliphatic acids (Obtained in Perkin Reaction).
(36)	*J Org Chem* **15**, 451-6 1950 (Dippy and Evans)	The nature of the catalyst in the Perkin Condensation.
(37)	*J Am Chem Soc* **72**, 3874-7, 1950 (Angel & Day)	Addition of acetic anhydride to benzalaniline and the Perkin Reaction in the nitrogen system.
(38)	*Ibid* **72**, 4322-3 1950 (Zuffanti and Sardella)	Calcium hydride as a basic catalyst in the Perkin Reaction.
(39)	US Pat 2,528,542 (Schering Corp-Schwenk and Papa—Nov 7, 1950)	Halohydroxy aryl aliphatic acids (Prepared by a Perkin Condensation).
(40)	*Repts Sci Res Inst Japan* (Ishikawa) (*Chem Abst* **45**, 4674e)	Perkin Reaction. (V) Reaction between enanthole and anhydrous acetic acid.
(41)	*Rec Trav Chim Pays Bas* **70**, 146-54, 1951 (Polya and Spotswood) (*Chem Abst* **45**, 7546)	Amides. (VII) The use of diacylimines in the Perkin Reaction.
(42)	*Rec Trav Chim Pays Bas* **71**, 684-8, 1952 (Polya and Parkes) (*Chem Abst* **48**, 2582i)	Amides (X) The use of tertiary amides in the Perkin Reaction.
(43)	Czechoslov Source (Horak) (*Chem Abst* **46**, 7100d)	New Application of the Perkin Reaction.
(44)	*Ann Chim (Rome)* **42**, 185-92, 1952 (Scivioni and Borsetto) (*Chem Abst* **47**, 3293h)	Furfural in the Perkin Synthesis.
(45)	*Proc Japan Acad Sci* 1951 (Nozoe et al) (*Chem Abst* **47**, 6390a-i)	Perkin Reaction of o-carboxy-m-carboxy- methyl tripolone.
(46)	*Rept Sci Res Inst Japan* (Ishikawa) (*Chem Abst* **48**, 5828)	Perkin's Reaction (VI) Reaction between benzaldehyde and acetic anhydride (VII) Reaction between anisaldehyde and acetic anhydride.

Excerpt from the Olney Medal Address of Dr Louis A Olney—October 14, 1944

"AMONG the events of a more social nature which I will always look back to with much pleasure was the visit of Sir William Henry Perkin to the United States in 1906, on the occasion of the 50th anniversary of his discovery of mauve, which is generally accredited as being the first coal-tar dye.

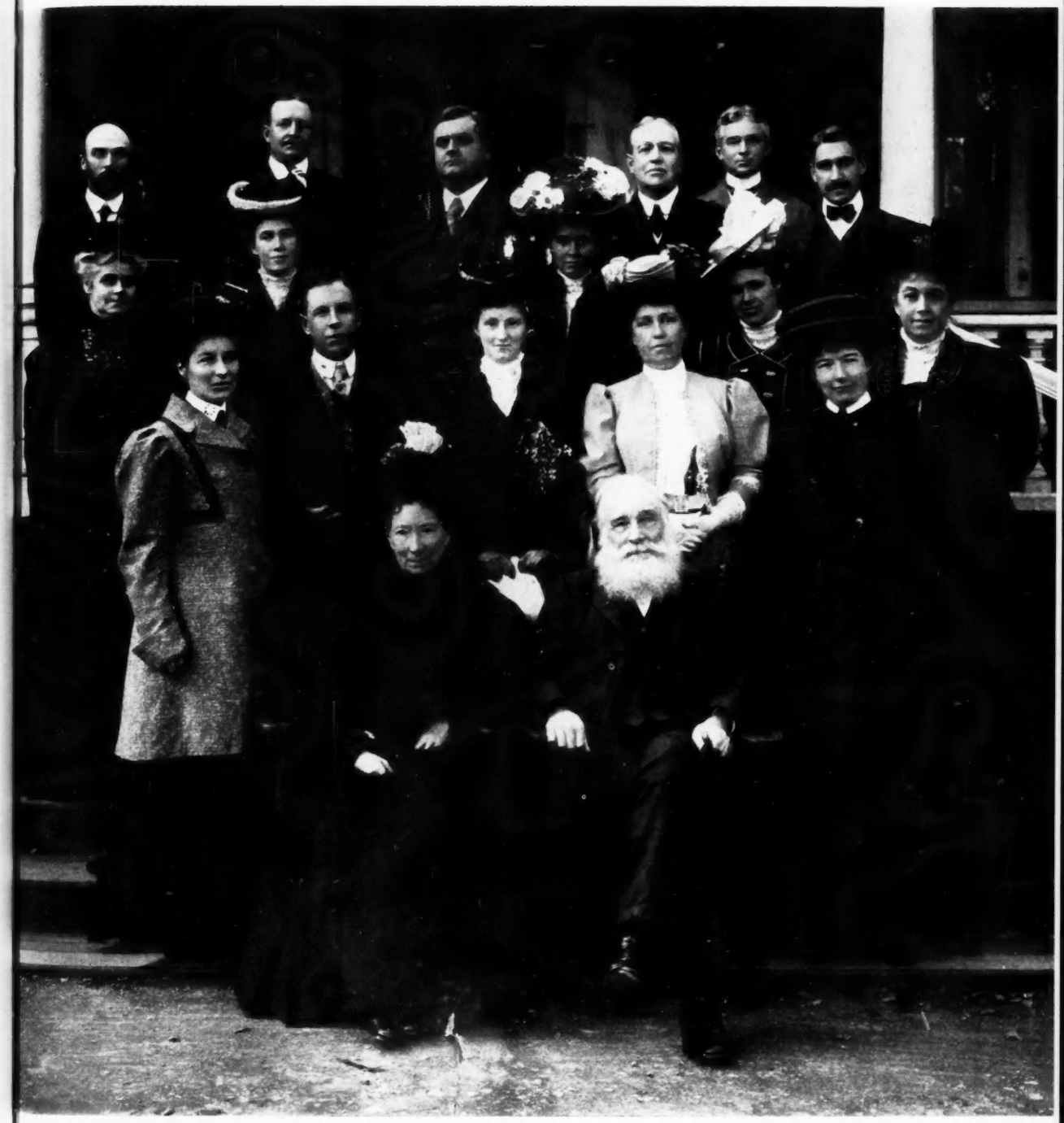
"After being royally entertained in New York by the dyestuff and textile interests in that locality, Sir William was to come to Boston, where we planned to outdo New York in our entertainment and celebration.

"I had the pleasure of serving upon the committee which was assigned the arranging of the whole program. One day was spent in visiting some of the large mills and points of interest about Boston. I had the pleasure of entertaining Sir William in Lowell and I remember that he showed great interest as I took him around through the Lowell Textile School.

"Another day was spent in entertaining the entire Perkin family at the Brookline Country Club. I am fortunate enough to have a photograph of the whole party taken at the time, including the seven members of the committee, and their wives, together with Sir William, Lady Perkin and their two daughters. In passing I might say that Alan Claflin and myself are the only two surviving members of the committee.

"The whole affair wound up with a grand banquet at the Algonquin Club. It was rather difficult to entertain Sir William at some of these affairs, as we discovered that he was a vegetarian and a teetotaler and furthermore we did what was possibly the inappropriate thing, of presenting him with a magnificent silver punch bowl."—American Dyestuff Reporter of November 6, 1944, page P471

(*See photo on P609*)



Group which entertained the Perkin family at the Brookline (Mass) Country Club in 1906. From left to right they are as follows: first row—Lady Perkin and Sir William Perkin; Second row—Miss Perkin, Alan A Claflin, Mrs Olney, Mrs H J Potter, Miss Perkin; third row—Mrs Clexton, Mrs Claflin, Mrs Walker, Mrs Gagnebin, Mrs Atteaux; fourth row—Prof H P Talbot, C L Gagnebin, Thomas J Clexton, F E Atteaux, W H Walker, Dr L A Olney

GENERAL PROGRAM

(All events at the Waldorf-Astoria Hotel)

MONDAY, SEPTEMBER 10, 1956

"International Day"

Sponsors: **American Standards Association**
International Organization for Standardization

Morning: 9:30 AM—Empire Room

Topic: **Colorfastness of Textiles**

Sponsors: **American Association of Textile Chemists and Colorists**
American Society for Testing Materials

Presiding: Charles A Sylvester, E I du Pont de Nemours & Co, Inc

Chairman: William D Appel, National Bureau of Standards

Paper: A Century of Progress in Colorfastness Test Methods

Speaker: M L Staples, Ontario Research Foundation

Paper: The Development of Test Methods for Colorfastness in France

Speaker: J P Niederhauser, Compagnie Francaise des Matieres Colorantes

Paper: The Standard Depths of Shade in Relation to the Assessment of Colorfastness of Dyes on Textiles

Speaker: Paul Rabe, Farbenfabriken Bayer AG

Paper: Current Developments in Colorfastness Testing—Switzerland

Speaker: Fritz Buxtorf, Sandoz Ltd

Paper: Current Developments in Colorfastness Testing—United Kingdom

Speaker: P W Cunliffe, British Cotton and Wool Dyers Assoc

Paper: Current Developments in Colorfastness Testing—USA

Speaker: Charles A Sylvester, E I du Pont de Nemours & Co, Inc

Afternoon: 12:15 PM—Starlight Roof

International Day Luncheon

Sponsors: **American Standards Association and International Organization for Standardization**

Presiding: H Thomas Hallowell, Jr, American Standards Association

Greetings: Raymond W Jacoby, chairman, Perkin Centennial Committee

Presentation: The Perkin Medal of the Society of Dyers and Colourists will be awarded posthumously to Dr Wallace H Carothers by Clifford Paine, president of the Society

Acceptance: Mrs Wallace H Carothers

Introduction of Guest Speaker: Crawford H Greenewalt, E I du Pont de Nemours & Co, Inc

Speaker: Sir Robert Robinson, Society of Dyers and Colourists

Subject: "Sir William Perkin—His Life and Work"

Interlude: Film—"Rhapsody in Color"

Topic: **Color—The Catalyst of Commerce**

Sponsors: **American Standards Association**
International Organization for Standardization

Presiding: Charles W Dorn, American Association of Textile Chemists and Colorists

Chairman: J Robert Bonnar, General Aniline & Film Corp

Panelists from the United States:

Advertising	— John A Cairns, Anderson and Cairns, Inc
Automobiles	— Robert Bingman, Chrysler Corp
Consumer Products	— Willie May Rogers, Good Housekeeping Institute
Converting	— Jackson E Spears, Burlington Industries, Inc
Dyestuffs and Fine Chemicals	— Kenneth H Klipstein, American Cyanamid Co
Fabric Manufacturing	— John E Reeves, Reeves Brothers, Inc
Fiber Manufacturing	— Harry L Dalton, American Viscose Corp
Garment Manufacturing	— Joseph Knapp, Fox-Knapp Manufacturing Co
Packaging	— Albert Kner, Container Corp
Paper	— George Stuhr, International Paper Co
Plastics	— L Kenneth Merrill, Union Carbide and Carbon Corp
Retailing	— Philip M Talbott, Woodward and Lothrop
Safety	— Arthur S Johnson, American Mutual Liability Insurance Co
Style and Fashion	— Dorothy Liebes, textile designer and colorist
Television	— Robert A Seidel, Radio Corp of America

Panelists from other countries:

Canada	— J W Eaton, The Eaton Co, Ltd
Switzerland	— Werner Kunz, Heberlein & Co, AG
United Kingdom	— Clifford Paine, Imperial Chemical Industries, Ltd

TUESDAY, SEPTEMBER 11, 1956

Morning: 9:30 AM—Empire Room

Presiding: William H Peacock, American Cyanamid Co

Topic: **The Application of Colorants to Plastics**

The Society of the Plastics Industry, Inc

Paper: The Application of Colorants to Polystyrene and Modified Polystyrene Plastics
Speaker: George Godfrey, Koppers Co, Inc

Paper: The Application of Colorants to Polyethylene
Speaker: Frank J Hines, Catalin Corp of America

Paper: The Application of Colorants to Rubber and other Elastomeric Plastics
Speaker: H M Whitacre, Akron Chemical Co

Paper: Ultraviolet Absorbers in Plastics
Speakers: W B Hardy and Ralph Coleman, American Cyanamid Co

Paper: Colorants for Acrylic Plastics
Speaker: S C Kelton, Jr, Rohm & Haas Co

Paper: The Preparation and Use of Special Polystyrene Color Standards for Fresh and Processed Food Products
Speaker: G W Ingle, Monsanto Chemical Co

Morning: 9:30 AM—Perroquet Suite

Presiding: Kenneth R Fox, Fabric Research Laboratories, Inc

Topic: **The Application of Colorants to Drugs, Cosmetics, and Medicine**

Sponsors: **The American Pharmaceutical Association**
Society of Cosmetic Chemists
U S Department of Pathology

Paper: The Use of Colorants as Drugs and in Drugs

Speaker: Jack Cooper, Ciba Pharmaceutical Products, Inc

Paper: Color in Cosmetics
Speaker: Donald H Powers, Warner-Lambert

Paper: Aniline Dyes—Their Impact on Biology and Medicine
Speaker: Morris C Leikind, Historical Research Div, Armed Forces Inst of Pathology

Afternoon: 2:00 PM—Empire Room

Presiding: Ell Dee Compton, Eagle Ottawa Leather Co

Topic: **The Application of Colorants to Leather**

Sponsor: **The American Leather Chemists Association**

Paper: The Chemical and Physical Nature of Leather Fibers in Relation to Dyeing
Speaker: Robert Stubbings, Chemistry Dept, Lehigh Univ

Paper: Coloring of Leather on Which Penetration is Desired
Speaker: Joseph A Casnocha, Sandoz Chemical Works, Inc

Paper: The Spray or Brush Dyeing of Leather
Speaker: C H Geister, E I du Pont de Nemours & Co, Inc

Paper: Dyes and Dyeing Processes for Special Properties of Color
Speaker: J S Kirk, General Aniline & Film Corp

Afternoon: 2:00 PM—Perroquet Suite

Presiding: E I Stearns, American Cyanamid Co

Topic: **The Physics of Color**

Sponsors: **Optical Society of America**
Inter-Society Color Council
American Society for Testing Materials

Paper: Color Control—Twenty-Five Years' Progress
Speaker: Frank J O'Neil, Pacific Mills

Paper: Progress in Measuring Color Differences
Speaker: G W Ingle, Monsanto Chemical Co

* * *

Topic: **Color in National Defense**

Sponsor: **National Research Council Advisory Committee**

Paper: Color in National Defense
Speaker: Stephen J Kennedy, Headquarters, Quartermaster Research and Development Command

* * *

Topic: **The Impact of Synthetic Dyes on Our Economy**

Sponsor: **US Department of Commerce**

Paper: The Impact of Synthetic Dyes on Our Economy
Speaker: Charles C Concannon, US Dept of Commerce

WEDNESDAY, SEPTEMBER 12, 1956

Morning: 9:30 AM—Empire Room

Presiding: B E Proctor, Department of Food Technology, Massachusetts Institute of Technology

Topic: **The Application of Colorants to Food**

Sponsor: **Institute of Food Technologists**

Paper: The Structure & Properties of Present-Day Food Colors
Speaker: Samuel Zuckerman, H Kohnstamm & Co, Inc

Paper: Sugar and Chocolate Candies
Speaker: Philip P Gott, National Confectioners' Assn

Paper: Meat and Meat Products
Speaker: Henry R Kraybill, American Meat Institute Foundation

Paper: Cereals and Baked Products
Speaker: William B Bradley, Scientific Div, American Institute of Baking
Paper: Significance of Color in Dairy Products
Speaker: Arnold H Johnson, National Dairy Research Laboratories, Inc
Paper: Citrus Products
Speakers Kenneth H Klipstein, American Cyanamid Co
Paper: Psychological Aspects of Food Colors from the Consumer's Standpoint
Speaker: Dean Foster, US Testing Co, Inc

Morning: 9:30 AM—Starlight Roof

Topic: **The Psychology of Color**

Sponsors: **American Psychological Association**
Inter-Society Color Council

Presiding: George O Linberg, Synthron Inc
Paper: Description of Color
Speaker: Deane B Judd, National Bureau of Standards
Paper: Seeing Light and Color
Speaker: Ralph M Evans, Eastman Kodak Co
Paper: Color in Industrial Design
Speaker: Walter C Granville, Container Corp of America

* * *

Topic: **Color Harmony from Fashion to Industry**

Sponsor: **The Color Association of the United States, Inc**

Paper: Color Harmony from Fashion to Industry
Speaker: John F Warner, D B Fuller & Co

* * *

Topic: **The Application of Colorants to Paper**

Sponsor: **Technical Association of the Pulp and Paper Industry**

Paper: Color in Paper: Rags to Riches
Speaker: Leonard Schlosser, Schlosser Paper Corp

Afternoon: 2:00 PM—Empire Room

Presiding: E R Allen, Rutgers University

Topic: **Pigments and Color Lakes**

Sponsors: **Dry Color Manufacturers' Association**
National Paint, Varnish and Lacquer Association, Inc

Paper: The Influence on Mankind of Colorants in Organic Coatings
Speaker: Frank Connolly, John W Masury & Son
Paper: Advances in Phthalocyanine Technology
Speaker: R E Brouillard, General Aniline & Film Corp
Paper: The Influence of Perkin's Discovery on the Graphic Arts Industry
Speaker: Thomas Craig, Sun Chemical Corp
Paper: The Chemistry of Organic Pigments
Speaker: A Siegel and W S Struve, E I du Pont de Nemours & Co, Inc
Paper: The Economic Significance of Colorants in Coatings
Speaker: Norman S Cassel, Interchemical Corp

Afternoon: 2:00 PM—Starlight Roof

Presiding: Calvin S Hathaway, Cooper Union Museum

Topic: **The History of Color**

Sponsor: **American Association for the Advancement of Science**

Paper: Color in Relation to the Political and Economic History of the Western World
Speaker: S M Edelstein, Dexter Chemical Corp
Paper: Color in Ancient Times
Speaker: Earle R Caley, Ohio State Univ
Paper: Color Designation Through the Ages
Speaker: Ernest R Kaswell, Fabric Research Laboratories, Inc

Evening: 7:45—Jansen Suite

AATCC Council Meeting

THURSDAY, SEPTEMBER 13, 1956

Morning: 9:15 AM—Starlight Roof

Presiding: L J Sheps, Trilon Chemicals Ltd

Topic: **The Application of Colorants to Textiles**

Sponsors: **Canadian Association of Textile Colourists and Chemists**
American Association of Textile Chemists and Colorists

Paper: The Application of Colorants to Glass Fibers
Speaker: R F Caroselli, Owens-Corning Fiberglas Corp
Paper: Internal Application of Color in the Manufacture of Man-made Fibers
Speaker: C E Coke, Courtaulds Ltd
Paper: Improvements in Dyeing Cotton with Sulfur Dyestuffs
Speakers: J L Crist and R E Rupp, Southern Dyestuff Corp

Morning: 9:30 AM—Empire Room

Presiding: Walter M Scott, US Dept of Agriculture

Topic: **The History of Dyeing**

Sponsor: **American Association of Textile Chemists and Colorists**

Paper: The Development of Fast Colors for Textiles
Speaker: F M Fordemwalt, American Cyanamid Co
Paper: The Development of the Art of Textile Printing
Speaker: Herman P Baumann, American Aniline Products, Inc
Paper: The Development of Modern Textile Dyeing Techniques
Speaker: Paul Meunier, E I du Pont de Nemours & Co, Inc

* * *

Topic: **The Manufacture of Synthetic Dyes**

Sponsors: **Synthetic Organic Chemical Manufacturers Association and the Manufacturing Chemists' Association, Inc**

Paper: America's Debt to Perkin
Speaker: Samuel Lenher, E I du Pont de Nemours & Co, Inc

Afternoon: 12:30 PM—Grand Ballroom

Olney Medal Award Luncheon

Sponsor: **American Association of Textile Chemists and Colorists**

Presiding: Henry E Herrmann, Vat Dye Institute
Address: "The Olney Medalist"
Speaker: E R Schwarz, Massachusetts Institute of Technology
Presentation of the Olney Medal: Raymond W Jacoby, president, AATCC
Address of the Medalist: Walter J Hamburger, Fabric Research Laboratories, Inc

Afternoon: 4:00 PM—Grand Ballroom

Topic: **Color in the World of Fashion**

Sponsors: **Good Housekeeping Institute**
National Retail Dry Goods Association

A stage musical presentation: Cavalcade of Color—depicting the development of Color in the World of Fashion

FRIDAY, SEPTEMBER 14, 1956

9:30 AM and 2:00 PM—Grand Ballroom

Presiding: M L Crossley, American Cyanamid Co (AM); Miles A Dahlen, E I du Pont de Nemours & Co, Inc (PM)

Topic: **The Chemistry of Synthetic Dyes**

Sponsor: **American Chemical Society**

Symposium: "A Century of Progress in the Synthesis of Dyes"

Paper: Early Synthetic Dyes
Speaker: Hans Z Lecher, consultant

Paper: Dyes for Cotton
Speakers: W W Williams and D I Randall, General Aniline & Film Corp

Paper: Dyes for Animal Fibers
Speaker: James Ogilvie, National Aniline Div, Allied Chemical & Dye Corp

Paper: Dyes for Nontextile Coloration
Speaker: M A Perkins, E I du Pont de Nemours & Co, Inc

Paper: Dyes for the Hydrophobic Fibers
Speakers: H E Schroeder & S N Boyd, Jr, E I du Pont de Nemours & Co, Inc

Paper: Dyes in Photography
Speakers: L G S Brooker and P W Vittum, Eastman Kodak Co

Paper: Fluorescent White Dyes
Speaker: R S Long, American Cyanamid Co

Evening: 7:00 PM—Grand Ballroom

Perkin Medal Award Banquet

Sponsors: **American Section of the Society of Chemical Industry in conjunction with**
American Chemical Society
American Institute of Chemical Engineers
Electrochemical Society
American Section of Société de Chimie Industrielle

SATURDAY, SEPTEMBER 15, 1956

Morning: 9:30 AM—Grand Ballroom

Presiding: Howard J White, Jr, Textile Research Institute

Topic: **Theories of Dyeing**

Sponsor: **Textile Research Institute**

Paper: The Theory of Dyeing Natural and Synthetic Polyamide Fibers
Speaker: Milton Harris, Harris Research Laboratories

Paper: The Theory of Dyeing Cellulosic Fibers
Speaker: Emery I Valko, Onyx Oil and Chemical Co

Paper: The Theory of Dyeing Polyacrylic and Polyester Fibers
Speakers: W R Remington & H E Schroeder, E I du Pont de Nemours & Co, Inc

Afternoon: 2:00 PM—Grand Ballroom

AATCC Intersectional Contest

Presiding: Earle McLeod, Arnold Hoffman & Co, Inc

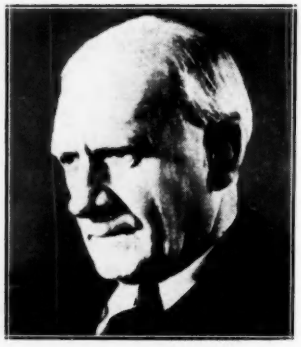
Sponsor: **American Association of Textile Chemists and Colorists**

Participating Sections:
Mid-West
New York
Pacific Southwest
Philadelphia
Piedmond
Rhode Island
South Central
Washington

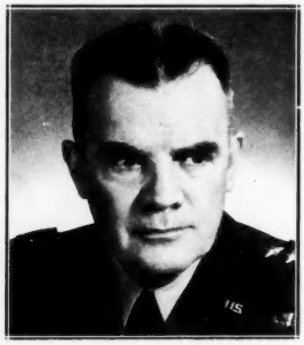
Evening: 7:00 PM—Grand Ballroom

Annual AATCC Banquet

Presiding: George O Linberg, Synthron Inc
Welcoming Address: Raymond W Jacoby, AATCC president
Intersectional Contest Awards: Earle McLeod, chairman, AATCC Intersectional Contest Committee
American Dyestuff Reporter Award: Walter M Scott, chairman, AATCC Publication Committee
Presentation of a painting of Sir William H Perkin to the AATCC from Imperial Chemical Industries Ltd: Clifford Paine, president, Society of Dyers and Colourists
Presentation of the Past President's Pin: J R Bonnar
Greetings to Dr Harold C Chapin, past secretary, AATCC: R W Jacoby
Address: Gen Anthony C McAuliffe (ret)



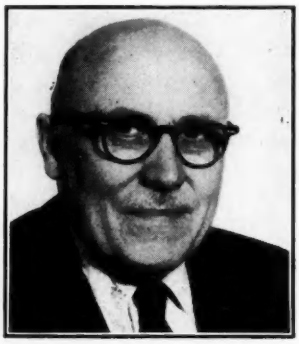
SIR ROBERT ROBINSON
(Society of Dyers and Colourists)
Speaker, International Day Luncheon
(Biography on page P639)



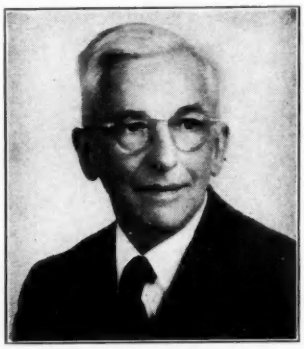
GENERAL A C McAULIFFE
(U S Army, retired)
Speaker, AATCC Banquet
(Biography on page P619)

WALTER J HAMBURGER
(Fabric Research Labs, Inc)
1956 Olney Medalist
(Biography on page P616)

NANCY WHITE
(Good Housekeeping)
Cochairman, "Calvacade of Color"
(See page P618)



LEONARD S LITTLE
(Consultant)
Chairman, International Day Committee



HAROLD C CHAPIN
Retiring secretary of AATCC who will be honored at the AATCC Banquet

COMMITTEE OFFICES

The offices of the various Centennial committees will be located as follows:

ASTM
Room J, 4th Floor, Sunday and Monday

Dining
Room M, 4th Floor, Wednesday-Saturday

Exhibits
Room P, 4th Floor, Entire Week

International Day
Room M, 4th Floor, Monday Only

Ladies' and Entertainment
Room X, 4th Floor, Entire Week

Movies
Room X, 4th Floor, Tuesday-Saturday AM and PM

Printing
Room N, 4th Floor, Entire Week

Publicity and Press
Regency Suite, 4th Floor, Entire Week

Registration Committee
Room F, 4th Floor, Entire Week

Registration Desk
Grand Ballroom Checkroom, 2nd Floor, Entire Week

NOTE
Room M, 4th Floor, is available for General Program Committee throughout entire week. May be used for various society representatives and speakers as needed.

LADIES' PROGRAM

MONDAY, SEPTEMBER 10, 1956

10:00-11:00 AM—"Coffee and . . ." in Room X, 4th Floor, Waldorf-Astoria (Perroquet Suite). Tickets for both radio and television programs will be available throughout the day from the hostess in attendance in Room X. Tours for NBC at 70¢ per person will be arranged on request.*

TUESDAY, SEPTEMBER 11, 1956

Same schedule as for Monday, September 10.

WEDNESDAY, SEPTEMBER 12, 1956

10:00-11:00 AM—"Coffee and . . ." in Room X, 4th Floor, Waldorf-Astoria (Perroquet Suite)
12:30 PM—Special Ladies Program. Luncheon in the La Vie Room at the Shelton Hotel. Luncheon to be followed by an English rendition of the opera "Carmen" in the same room.

THURSDAY, SEPTEMBER 13, 1956

10:00-11:00 AM—"Coffee and . . ." in Room X, 4th Floor, Waldorf-Astoria (Perroquet Suite)
10:30 AM-1:30 PM—Three-hour luxury boat trip around Manhattan Island
4:00-5:30 PM—"Cavalcade of Color"—Grand Ballroom, Waldorf-Astoria

FRIDAY, SEPTEMBER 14, 1956

10:00-11:00 AM—"Coffee and . . ." in Room X, 4th Floor, Waldorf-Astoria (Perroquet Suite)
11:30 AM-2:00 PM—Luncheon at the United Nations Building followed by a tour

SATURDAY, SEPTEMBER 15, 1956

10:00-11:00 AM—"Coffee and . . ." in Room X, 4th Floor, Waldorf-Astoria (Perroquet Suite)

The fee for the Ladies' Special Program covers the luncheon and entertainment at the Shelton Hotel on Wednesday. All other features on the Ladies' Program are covered by the Lady Guests' Registration Fee. There will be no additional charge except for the NBC tours as indicated.

*Radio and television tickets will also be available at the hostess' desk in Room X for the rest of the week for those interested.

BOOK OF PROCEEDINGS

A copy of the Proceedings of the Perkin Centennial will be mailed to each regular registrant as soon after the closing of the Centennial as it can be prepared.

Additional copies can be ordered at the Registration Desk at a cost of $10.00 each.

Those not attending the Centennial can order copies from

Richard R Frey, assistant secretary, AATCC
Lowell Technological Institute
Lowell, Mass.

In placing such orders please give correct mailing address and enclose check or money order for $10.00 per copy.

REGISTRATION & FEES

Registration for the Perkin Centennial will commence Sunday afternoon, September 9th, at the Registration Desk, located at the Grand Ballroom Checkroom, 2nd Floor, Waldorf-Astoria Hotel. Beginning Monday, September 10th and continuing through Saturday, September 15th, the Desk will be open 9:00 am to 5:00 pm.

Registration Fee:	
General Registration	$10.00
Lady Guests (No Book)	5.00
Students (No Book)	5.00
Ladies Special Program	5.00
International Day Luncheon, Sept 10	10.00
Olney Medal Award Luncheon—Sept 13	10.00
Perkin Medal Award Dinner, Sept 14	15.00
Annual AATCC Banquet—Sept 15	15.00

REGISTRATION FEES ARE REQUIRED FOR PARTICIPATION IN ANY PART OR ALL OF THE PERKIN CENTENNIAL, EXCEPT THE INTERNATIONAL DAY LUNCHEON AND THE PERKIN MEDAL AWARD DINNER.

There is no fee required for those planning to attend only the International Day functions. Luncheon tickets will admit holders to all sessions of International Day (see Program, page P610). Requests for tables of ten may be made.

Checks should be made payable to "AATCC Perkin Centennial 1956". Send to Roy Hamilton, Interchemical Corp, 150 Wagaraw Rd, Hawthorne, NJ.

EASTMAN KODAK EXHIBIT

THE Eastman Kodak Company is marking the observance of the Centennial through a special exhibit in the famous Kodak Photographic Information Center in the Grand Central Terminal in New York. The exhibit will depict the application of modern color photography to the "more colorful world" of today. Also on display will be products illustrating the use of dyes in the production of plastics and the latest in textile fibers.

A color slide show will operate continuously from 10 am to 10 pm daily. It will demonstrate the layering of emulsions on a typical color film and the manner in which dyes are formed in the emulsion by the photographic developing process. Four color transparencies, each 30″ x 40″ in size, will portray the old and the new in the use of color in fashion and the home. Some of the most dramatic sports color photographs of the last several years will also be seen.

Culminating the Kodak exhibit will be the giant Kodak Colorama. This spectacular color transparency will be 18 feet by 60 feet in size and is made by direct enlargement from a color negative—to become one of the "largest color pictures in the world".

The exhibit is of such grandeur that it will undoubtedly be one of the focal points of interest during the Centennial.

OLNEY MEDAL AWARD

Walter J Hamburger, director and treasurer of Fabric Research Laboratories, Dedham, Mass, will be awarded the Olney Medal of the American Association of Textile Chemists and Colorists for 1956 at the annual Olney Medal Luncheon of AATCC on Thursday, September 13th, in the Grand Ballroom of the Waldorf-Astoria Hotel. Dr Hamburger is the thirteenth person to win the award, others being:

Louis A Olney—1944
Milton Harris—1945
William H Cady—1946
Edward R Schwarz—1947
Harold M Chase—1948
Charles A Seibert—1949
George L Royer—1950
Raymond W Jacoby—1951
Werner von Bergen—1952
Roland E Derby—1953
William D Appel—1954
Miles A Dahlen—1955

The Olney Medal was endowed by the Howes Publishing Company, Inc and is awarded by the AATCC annually, or at such longer intervals as the Committee of Award may elect, to a citizen of the United States for outstanding achievement in the field of textile chemistry, including the development of chemical agents or chemical processes used in the manufacture of textiles, or methods for their evaluation. Its purposes are to encourage and to afford public recognition of such achievements and contributions, and to be a testimonial to Louis A Olney in recognition of his lifetime of devotion and multitudinous contributions to this field.

The election of a candidate to receive the Award under the rules agreed upon by the Association and the Howes Publishing Company is by unanimous vote of the Olney Medal Committee of five, constituted as follows: (1) the President of the Association; (2) a member of the faculty of an educational institution awarding degrees in chemistry; (3) an employee of a concern manufacturing chemical products used in textile wet processing; (4) an employee of a concern manufacturing textiles; (5) a member at large who may be any qualified individual. All must be senior members of the Association.

The present members of the committee and their terms of office from January, 1955 are: (1) Raymond W Jacoby; (2) Percival Theel, 3 yrs; (3) Paul L Meunier, 4 years; (4) Harley Y Jennings, 1 year; (5) Walter M Scott, 2 years. The secretary of the Association is secretary of the Committee without vote. As the term of each elected member expires, the Committee itself elects a successor to serve for four years.

Dr Hamburger has been connected with Fabric Research Laboratories since 1942, and before that was treasurer and technical director of H Schindler & Co, Inc, Canton, Mass, with whom he worked from 1930-1944. Prior to 1930 he served in general engineering capacities and was in the paper industry for several years as an industrial engineer.

Dr Hamburger is 55 years old, was born in Boston, and is married, with two children. He lives at 62 Abbott Road, Dedham, Mass.

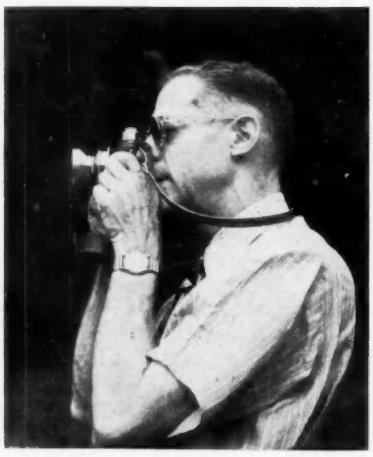
He received his Bachelor of Science degree in mechanical engineering from Massachusetts Institute of Technology in 1921; his Master of Science in textile technology, also from MIT, in 1941; and his Doctor of Philosophy degree from Polytechnic Institute of Brooklyn in 1948.

He has received other honors from several institutions, including an honorary MS from Lowell Technological Institute, and a certificate of distinction from the Polytechnic Institute of Brooklyn. He was Edgar Marburg lecturer with the American Society of Testing Materials in 1955, and is an honorary member of several professional groups.

Dr Hamburger has published scientific papers in many technical and industrial publications, and is listed in "American Men of Science." He is a member of Sigma Xi Society; a fellow of the Textile Institute, Manchester, England; past national councilor of the AATCC; past president of the Fiber Society, Inc; a member of the American Association for the Advancement of Science; and member of Committee D-13 of ASTM.

His main fields of concentration have been textile technology; the mechanical behavior of filamentous high polymers; instrumentation; and sonic techniques for investigation of stress-strain relationships.

His many activities have included visiting lecture-



WALTER JULIAN HAMBURGER—1956 OLNEY MEDALIST

ships and professorships, with Massachusetts Institute of Technology Textile Division, Simmons College, Polytechnic Institute of Brooklyn, and Lowell Technological Institute.

He is presently chairman of the National Academy of Sciences National Research Council Advisory Board Panel on Textiles, and during World War II was consultant to the U S Army Air Forces on research direction of projects.

He was also chairman of the Committee on Body Armor of the National Research Council Advisory Board of Quartermaster Research and Development, and is a member of the General Research Advisory Committee of the Textile Research Institute at Princeton, NJ

He is a member of the board of directors of the Lowell Technological Institute Research Foundation and was chairman of the Executive Committee thereof from 1951-1954.

BIOGRAPHICAL SKETCH
WALTER JULIAN HAMBURGER

General

Born—Boston, Massachusetts, November 19, 1901.
Married—2 children.
Address—62 Abbott Road, Dedham, Massachusetts.

Education

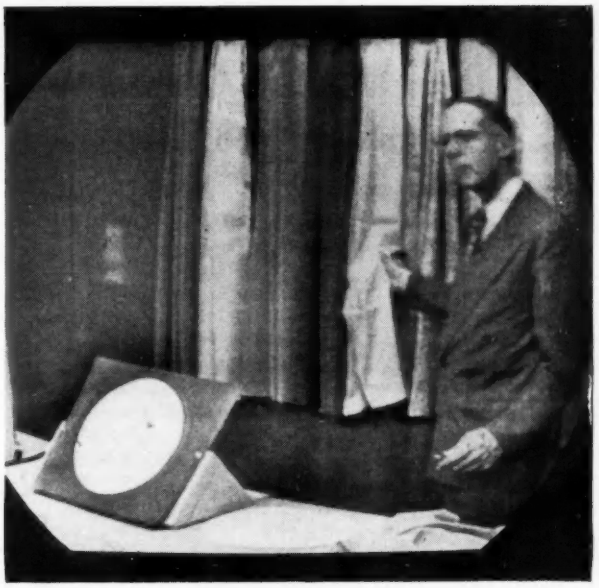
Bachelor of Science in mechanical engineering, Massachusetts Institute of Technology, 1921.
Master of Science in textile technology, Massachusetts Institute of Technology, 1941.
Doctor of Philosophy in Polymer Mechanics, Polytechnic Institute of Brooklyn, 1948.

Professional Experience

General Engineering, 1922-1925.
Industrial Engineering, Paper Industry, 1925-1930.
Textile Industry:
Treasurer and technical director, H Schindler and Co, Inc, Canton, Mass, 1930-1944.
Director and treasurer, Fabric Research Laboratories, Inc, Dedham, Mass, 1942 to date.

Activities

Lecturer on textile research, Textile Division, Graduate School, Massachusetts Institute of Technology, 1941-1944. 1953.
Lecturer on textile technology, Simmons College, Boston, Mass, Academic Year 1943-1944.
Adjunct professor, polymer mechanics, Polytechnic Institute of Brooklyn, 1949-1952.
Visiting professor, Lowell Technological Institute, 1950 to date.
Treasurer of the Lowell Technological Institute Building Association.
Member of the Board of Directors, Lowell Technological Institute Research Foundation.
Chairman of the Executive Committee, Lowell Technological Institute Research Foundation, 1951-1954.
World War II—Consultant to USAAF, research direction of projects sponsored by OQMG, and USAAF.
Chairman, Committee on Body Armor, National Research Council, Advisory Board on Quartermaster Research and Development.
Member, General Research Advisory Committee, Textile Research Institute, Princeton, New Jersey.
Chairman, National Academy of Sciences, National Research Council Advisory Board—Panel on Textiles, 1956.



The Medalist on TV

Memberships

Society of the Sigma Xi.
Fellow of the Textile Institute (Manchester, England).
Past National Councilor of the American Association of Textile Chemists and Colorists.
Past President of The Fiber Society, Inc.
American Association for Advancement of Science.
Committee D-13, American Society for Testing Materials.

Honors and Awards

Honorary Degree of Master of Science, Lowell Technological Institute, 1952.
Honorary Member of Lowell Technological Institute Alumni Association.
Honorary Member of American Association for Textile Technology, Inc.
Edgar Marburg Lecturer, American Society for Testing Materials, 1955.
Certificate of Distinction, Polytechnic Institute of Brooklyn, 1956.
Olney Medalist, American Association of Textile Chemists and Colorists, 1956.

Fields of Concentration

Textile technology; mechanical behavior of filamentous high polymers; instrumentation; sonic techniques for investigation of stress-strain relationships.

Publications

Scientific papers in *Textile Research Journal, Rayon Textile Monthly, American Dyestuff Reporter,* American Society for Testing Materials, *Journal of the Textile Institute, Proceedings of the Scientific Section of the Toilet Goods Association,* American Society of Mechanical Engineers, American Association of Textile Technology, Inc, *Textile World, Canadian Textile Journal, Journal of the Society of Cosmetic Chemists.*

Reference

American Men of Science.

PERKIN MEDAL AWARD BANQUET

Edgar C Britton, director of the Edgar C Britton Research Laboratory of the Dow Chemical Company, Midland, Michigan, and past president of the American Chemical Society, will receive the 1956 Perkin Medal of the American Section of the Society of Chemical Industry at a meeting of the Section following a dinner in his honor in the Grand Ball Room on Friday, September 14.

The 1956 award will be the 50th impression of the Perkin Medal, the highest honor in American industrial chemistry. It is bestowed annually for outstanding achievement in applied chemistry in the United States and commemorates the discovery of the first synthetic dye by Perkin in 1856. Presentation of the medal this year forms part of the Perkin Centennial Celebration.

The Perkin Medal was founded in 1906 and the first impression was presented to Sir William Henry Perkin in commemoration of the fiftieth anniversary of his synthesis of mauve, the first synthetic dye. Subsequently it has honored outstanding American industrial chemists including: Irving Langmuir, for his development of the gas-filled incandescent electric light; Leo H Baekeland, for the development of Bakelite, first synthetic resin; Thomas Midgley, Jr, for the development of nondetonating fuels for internal combustion engines; Robert R Williams, for synthesis of vitamin B_1 (thiamin); Charles M Hall, for commercial production of aluminum; Herbert H Dow, for building an industry on his bromine recovery process; and other outstanding Americans for achievements in the field of applied chemistry that have helped raise our standard of living.

Cooperating with the officers of the American Section, Society of Chemical Industry, as members of the Jury of Award of the Perkin Medal are representatives of the American Chemical Society, the American Institute of Chemical Engineers, the Electrochemical Society, the American Section of the (French) Societe de Chimie Industrielle.

Recognized as an industrial chemist of first rank, Dr Britton is honored for many outstanding contributions to industrial organic chemical development. Included in his accomplishments that form the basis of the award are important contributions to the American organic chemical industry that produces vast numbers of modern necessities and comforts.

His early work on the synthesis of phenol (carbolic acid) provided this vital raw material in abundance for producing numerous aids to agriculture. Derivatives of phenol are essential to such important products as weed killers, insecticides, fungicides, and preservatives. Through these and related products, Dr Britton's work has given his company leadership in the production of a complete line of agricultural chemicals.

Agriculture is also indebted to Dr Britton for the synthesis of eight of the essential amino acids, Nature's protein building blocks; seven of these are now under scientific study as food supplements for man and animals. One of them, methionine, is the only essential amino acid now in commercial production; it is widely used in feed supplements, particularly for poultry.

Other notable accomplishments of Dr Britton contribute to the production of synthetic dyes, pharmaceuticals, synthetic rubber, silicone resins and great numbers of chemical compounds utilized in other kinds of chemical production. His work has been awarded more than 300 U S Patents and has been the subject of his numerous scientific papers published in the professional press.

Edgar Clay Britton was born in Rockville, Indiana, October 25, 1891. He attended Wabash College and University of Michigan, receiving from the latter the degrees of A B (1915) and Ph D (1918). Subsequently both Michigan (1952) and Wabash (1955) awarded him honorary degrees of Sc D. After his graduation, he was instructor in organic chemistry at the University of Michigan until 1920, when he joined the organic research staff of Dow Chemical Company. He has continued with Dow since that time as research chemist until 1932, as director of its organic research laboratory until 1953 and since then as director of its new Edgar C Britton Research Laboratory, the first Dow laboratory to be named in honor of an employee. He is also secretary and director of the Dow Corning Corporation. His genius has motivated large sections of the development of the Dow Chemical Company by supplying the scientific keys to problems of chemical production.

Dr Britton was president of the American Chemical Society in 1952 and is a member of the American Association for the Advancement of Science, American Institute of Chemists, the Chemical Society (London), Society of Chemical Industry, the Chemists' Club (New York), Alpha Chi Sigma, Phi Lambda Upsilon and Sigma Xi. He is active in the Kiwanis Club, the Torch Club and the Midland Country Club.

The American Section, Society of Chemical Industry, cordially invites all interested to attend the dinner and presentation honoring this distinguished American Chemist.

CAVALCADE OF COLOR

SCIENCE and show business will join forces in "Cavalcade of Color", entertainment highlight of the Perkin Centennial. A fast-moving song and dance revue, produced with professional stage talent by *Good Housekeeping* and the National Retail Dry Goods Association, will dramatize the evolution of dyes in the history of costume. This lively matinee will be presented at 4 pm on Thursday, September 13, in the ballroom of the Waldorf-Astoria.

Because of *Good Housekeeping*'s unique institute, and its textile laboratory, that magazine was chosen as particularly well qualified to present a panorama of color development. The "Cavalcade of Color", starting with primitive dye techniques of ancient times, will dramatize the stages of progress which were climaxed by William Henry Perkin's discovery of synthetic dyes. The second act of this Centennial matinee will emphasize the aesthetic and practical contribution of synthetic dyes to the rapid growth of modern fashion.

Nancy White, fashion director of *Good Housekeeping*, and George Wham, the magazine's director of textiles, are cochairmen of "Cavalcade of Color." The Good Housekeeping Institute is directed by Willie Mae Rogers.

FREE TICKETS up to the seating capacity of the Grand Ballroom for everyone with Perkin Centennial registration badges will be available at the ballroom entrance from 3:30 pm on matinee day. Each lady attending the Centennial will receive a ticket when she registers.

AATCC BANQUET

GENERAL Anthony Clement McAuliffe, U S Army (retired), will deliver the main address at the AATCC Annual Banquet in the Grand Ballroom of the Waldorf on Saturday night, September 15th, climaxing the week-long Perkin Centennial celebration.

General McAuliffe, since his retirement from the Army on June 1st, has been serving as general manager of American Cyanamid Company's new Engineering and Construction Division, with offices at 30 Rockefeller Plaza in New York.

Born in Washington, DC, July 2, 1898, General McAuliffe was commissioned a second lieutenant of field artillery upon being graduated from the United States Military Academy in 1918.

In 1923 he was in Hawaii with the 11th Field Artillery, returning to Fort Riley, Kansas, in 1926. He was again in Hawaii in 1932, but returned to the Command and General Staff School at Fort Leavenworth, Kansas, in 1936.

In 1944 General McAuliffe, as artillery commander of the 101st Airborne Division, parachuted into France in the invasion of Normandy. In the airborne invasion of Holland, he entered that country by glider with the Glider Echelon. In December of 1944, in the absence of the division commander, he commanded the 101st Airborne Division and the attached troops in the defense of the key road center of Bastogne during the Battle of the Bulge.

In 1945 he commanded the 103rd Infantry Division in the drive from Alsace through the famed Siegfried Line, and later raced through Germany and Austria to capture Innsbruck and the Brenner Pass to link up with American troops in Italy.

The General served at Bikini through the tests of the Atomic bomb, returning to the United States in 1947. He went to Japan in 1949 and came back the same year to become chief of the Chemical Corps.

In October, 1953, the General assumed command of the US Seventh Army in Germany and in 1955, he became commander-in-chief of the United States Army, Europe, the post he held until joining Cyanamid.

Recently, as guest of the City of New York, he acted as senior reviewing officer for the 1956 Armed Forces Day Parade and was honored by a retreat review at Fort Meyer in Washington, DC. General McAuliffe is married and has a daughter, Patricia, and a son, John.

General McAuliffe has been awarded the Distinguished Service Cross, Distinguished Service Medal, Silver Star, Legion of Merit, Bronze Star Medal with one Oak Leaf Cluster and two Presidential Citations. His foreign decorations include the British Distinguished Service Order and Bar; the French Legion of Honor and Croix de Guerre; The Belgian Order of Leopold, Croix de Guerre, and Fourragere, and The Netherlands Order of William and Order of the Golden Lion of Nassau.

THE winner of the sixth annual AMERICAN DYESTUFF REPORTER AWARD will be announced at the Annual Banquet on Saturday, September 15, 1956 in the Grand Ballroom of the Waldorf-Astoria Hotel.

Judges for this year's contest, appointed by the AATCC Publications Committee, are: R W Joerger, Franklin Process Co, *chairman;* R B Stehle, Allegheny Dye Works and H C Borghetty, Rohm & Haas Co.

The Award was endowed by the Howes Publishing Company as a memorial to Alfred P Howes, founder of the AMERICAN DYESTUFF REPORTER. Its purpose is to encourage the presentation of the best possible papers before local and national meetings of the Association. The Award, $200 annually, is presented to the author or authors of the paper considered best in the opinion of the judges. Any technical paper presented before a local or national meeting of the AATCC and published in the *Proceedings* as they appear in the AMERICAN DYESTUFF REPORTER is eligible with the following exceptions: Intersectional Contest papers, papers by employees of the AATCC, reports of work substantially subsidized by AATCC, or reports of research committees. It is a condition of eligibility that the paper have its first publication in the *Proceedings.* Papers published in the *Proceedings* from July 1st of one year to June 30th of the next year are considered in each judging period.

The first presentation of the ADR Award was made at the annual banquet of the New York Convention on October 19th, 1951 at the Hotel Statler, New York, to Mason Hayek and Fred C Chromey of the Jackson Laboratory of E I du Pont de Nemours & Co, Inc. The paper chosen was entitled "The Measurement of Static Electricity" and was published in the March 5, 1951 issue. It had been presented before the Auxiliaries and Testing Group Meeting at the Portsmouth National Convention in 1950 by Dr Hayek.

The second presentation of the Award was made at the annual banquet of the Boston Convention on November 8th, 1952 at the Hotel Statler, Boston, to Charles J Lyle, Joseph J Iannarone and Robert J Thomas of the Technical Laboratory, E I du Pont de Nemours & Co, Inc. The paper selected was "High-Temperature Dyeing of New Synthetic Fibers" which was published in the September 17, 1951 issue and presented by Dr Thomas before the Rhode Island Section in Providence on May 25, 1951.

The third presentation was made to Robert H Blaker of the Jackson Laboratory, E I du Pont de Nemours & Co, Inc, at the annual banquet of the Chicago Convention on September 19th, 1953 at the Conrad Hilton Hotel in Chicago. The paper, published in the February 2, 1953 issue, was entitled "Principles of Copper Dyeing of Polyacrylonitrile Fibers: The Controlled Redox-Potential Method" and was presented at the 1952 convention held in Boston.

The fourth presentation was made to Charles L Zimmerman, group leader for American Cyanamid Company's dyestuff department, at the annual banquet of the Atlanta Convention on September 18th, 1954 at the Atlanta Biltmore Hotel. The paper which won the award for Mr Zimmerman was entitled "The Application of Dyes to Textile Fibers at High Temperatures" and was published in the September 14, 1953 issue. This paper was presented before a meeting of the New York Section on April 17, 1953.

The fifth presentation was made to Henry E Millson, manager of the Dyestuff Technical Service Laboratories, Organic Chemicals Division, American Cyanamid Company, at the annual banquet of the Atlantic City Convention on September 24th, 1955 at the Chalfonte Hotel. The paper which won the award for Mr Millson was entitled "The Microdyeoscope: Microscopical Observations on Dyeing" and was published in the June 20, 1955 issue. This paper was presented before several sections of AATCC as follows: New York, January 11, 1952; Southeastern, February 23, 1952; Mid-West, October 4, 1952; Philadelphia, October 23, 1953; and Rhode Island, January 28, 1954.

BALLROOMS — THIRD FLOOR

THE WALDORF-ASTORIA

NEW YORK

PERKIN CENTENNIAL

EXHIBITS AT THE PERKIN CENTENNIAL

EXHIBIT HOURS

Tuesday, Sept 11—10 AM to 6 PM
Wednesday, Sept 12—10 AM to 9 PM
Thursday, Sept 13—10 AM to 9 PM
Friday, Sept 14—10 AM to 9 PM
Saturday, Sept 15—10 AM to 1 PM

The thought and planning of the Exhibits Committee under the chairmanship of Henry L Young, Interchemical Corp, have resulted in developing a series of inspiring exhibits keyed to the theme of "A More Colorful World". One of the exhibits will be composed of a number of integrated parts illustrating the historical background of man's attempt to color materials with natural dyes leading into the development of dyes and related materials in the field of organic chemicals since the discovery of mauve by Perkin one hundred years ago (Astor Gallery).

Another exhibit that will clearly show the close relationship between dyes and textiles will be devoted to textile fibers and fabrics. In addition to exhibits of natural fibers, the remarkable advances made in the realm of synthetic fibers, many of which are actually coal-tar derivatives, will provide a suitable counterpart to the dyes exhibit (Jade Room).

A third display will be devoted to the wide variety of functional finishes that are so important in modern textile processing. These make colored textiles practical and beautiful by imparting the desirable characteristics and properties that are sought by the ultimate consumer (Basildon Room).

A fourth unit will be a presentation of the American Association of Textile Chemists and Colorists. It will feature colorfastness and other testing equipment developed to assist in the production of finer quality fabrics capable of meeting exacting standards established by industry (East Ballroom).

"A MORE COLORFUL WORLD"—ASTOR GALLERY

Contributors

Alliance Color & Chemical Co
Althouse Chemical Co, Inc
American Aniline Products, Inc
American Cyanamid Co, Dyestuff Dept
Ansbacher-Siegle Corp
Arnold, Hoffman & Co, Inc
Blackman Uhler
Carbic-Moss Corp
Chemical Manufacturing Co, Inc
Ciba Co, Inc
E I du Pont de Nemours & Co, Inc
Dye Specialties, Inc
General Dyestuff Co
Geigy Dyestuffs
The Harshaw Chemical Co
The Hilton-Davis Chemical Co
Imperial Paper & Color Corp
Industrial Dyestuff Co
Interchemical Corp, Textile Colors Div
H Kohnstamm & Co, Inc
L & R Organic Products Co, Inc
Manufacturing Chemists' Assoc
Metro Dyestuff Corp
National Aniline Div, Allied Chemical & Dye Corp
Nyanza Color & Chemical Co, Inc
Pfister Chemical Works, Inc
Progressive Color & Chemical Co, Inc
Sandoz Chemical Works, Inc
Southern Dyestuff Corp
Sherwin-Williams Co
Synthetic Organic Chemical Manufacturers Association of the United States
United Aniline Co
Young Aniline Works, Inc

FIBERS—JADE ROOM

E I du Pont de Nemours & Co, Inc

Textile Fibers Department
Wilmington 98, Del

Booth #1, Jade Room

The Du Pont exhibit will highlight a three-dimensional, life-size "harlequin" figure of open wire construction, clothed in triangular pieces of brilliantly colored fabric made from Orlon acrylic fiber. The figure will be spotlighted to heighten the dramatic effect.

The backwall will feature fabrics of Orlon, Dacron polyester fiber and nylon especially dyed for the Perkin Centennial.

In attendance: G F Barry, Lee Bidgood, Jr, William Bell, R J Ellis, W J Foley, M W Goodell, J L Hallett, Jr, C F Hoffman, Jr, C W Holweger, Jr, R L Hunter, R F Lowery, J W Lynch, F G Parker, G M Richardson, R E Ritter, V D Stilbolt, H B Sturtevant, Jr, and D W Spaulding.

National Aniline Division
Allied Chemical & Dye Corp

261 Madison Ave,
New York 16, N Y

Booth #2, Jade Room

Caprolan deep-dye nylon yarns and fabrics.
In attendance: Robert E Ellsworth, George H Hotte, and Samuel A Cooper.

The Chemstrand Corporation

350 Fifth Ave
New York 1, N Y

Booth #3, Jade Room

The latest dyeing and finishing techniques for Acrilan acrylic fiber and Chemstrand nylon will be highlighted. A colorful array of fabric in a variety of fiber blends will be displayed. Visitors will see firsthand the wide color ranges and excellent finishes made possible as a result of Chemstrand's continuing research program in dyeing and finishing.

Emphasis will also be placed on fabric finishing with wash and wear fabrics and garments on display.

In attendance: Walter H Hindlle, associate director, Textile Department; Robert E Smith, Acrilan sales manager; Murray H Morse, nylon sales manager; additional technical specialists and marketing representatives.

Eastman Chemical Products, Inc
Subsidiary of Eastman Kodak Company

260 Madison Ave
New York 16, N Y

Booth #4, Jade Room

Fabrics containing Chromspun, Eastman color-locked acetate fiber.

American Enka Corporation

206 Madison Ave
New York 16, N Y

Boote #5, Jade Room

Enka rayon and nylon yarns. Also various fabrics made from these yarns.

In attendance: M B Carr, C L Hayden, C R Thayer, A B Harris, W B Shepard, E W Martin, S M Smith, K N Bacon, W M Pomeroy, Jr.

Courtaulds (Alabama) Inc

600 Fifth Ave
New York 20, N Y

Booth #6, Jade Room

This display will show the blending possibilities and colorfastness properties of Coloray. These will be combined with a display of fabrics made with Coloray.

In attendance: R Dunford, J A Plant, H M Carter and R C Fox.

Cranston Print Works Co

261 Madison Ave
New York, N Y

Booth #7, Jade Room

Carbide and Carbon Chemicals Co
A Division of Union Carbide & Carbon Corp

30 East 42nd St
New York 17, N Y

Booth #9, Jade Room

American Viscose Corp

350 Fifth Ave
New York 1, N Y

Booth #10, Jade Room

The Dobeckmun Company

350 Fifth Ave
New York 1, N Y

Booth #12

Celanese Corporation of America

180 Madison Ave
New York 16, N Y

Booth #14, Jade Room

FUNCTIONAL FINISHES—BASILDON ROOM

Morton Salt Company
Industrial Division

120 South La Salle St
Chicago 3, Ill

Booth #1, Basildon Room

This exhibit will feature specialized grades of salt suitable for textile usage and specialized brinemaking equipment.

In attendance: R A Simpson, Chicago; John Culp, Charlotte, NC; E R Ravenel, Atlanta; R D Murray, Boston; Berge Neill, Greenville, SC.

Gaston County Dyeing Machine Co

Stanley, N C

Booth #3, Basildon Room

The Company's laboratory package-dyeing machine will be on display.

In attendance: Gordon Hacker and Ray Craig.

Dexter Chemical Corp
Textile Chemicals Div

819 Edgewater Rd
New York 59, N Y

Booth #2, Basildon Room

This exhibit will feature rare books and manuscripts pertaining to dyes and the dyestuff industry.

In attendance: Sidney M Edelstein, Joseph B Evans, Joseph J McGuinness, Leonard Slesinger, William B Griffin, Azel Mack, and John F Kneeland.

Goodyear Chemical Division
The Goodyear Tire and Rubber Company, Inc

Akron 16, O

Booths 4 and 5, Basildon Room

This exhibit will illustrate textile applications for

Chemigum (nitrile type) latices, Pliolite (styrene type) latices, and Pliovic (vinyl copolymer) latex. Applications for Pliovic AO, a dispersion resin, will also be on display. Non-woven fabrics illustrating the use of Goodyear's synthetic latices as binders will be featured. Other textile applications on display will include carpet backing, fabric finishing, warp sizing, textile printing, and pigment binding.

In attendance: J E Warner, G Campbell, W F Gerrow, J S Brice, C S Baker, J W Bear, J M Hussey, E W Scott, W P Welch, I N Lanning.

Standard Chemical Products, Inc

1301 Jefferson St
Hoboken, N J

Booth #6, Basildon Room

A dozen or so fabrics and yarns that have been finished with Standard's products will be on display.

In attendance: J J Bloetjes, J H Calicott, L C Greene, L L Grombacher, L W Hamblen, A E Hirst, R A Jaegers, A H Kramer, J M Myers and Edward Pickup.

Rohm & Haas Company

Washington Sq
Philadelphia 5, Pa

Booth #7, Basildon Room

This exhibit will consist mainly of samples of various fabrics which have been treated with Rohm & Haas textile chemicals.

In attendance: R G Thomas, H F Lawton, H C Borghetty, J T Taylor, C M Clevenger, L C Harmon, Jr, H S Travis, J M Schandler, William Wald, R G Lawrence, and T E Sloan.

Onyx Oil & Chemical Co

Warren & Morris Sts
Jersey City 2, N J

Booth #8, Basildon Room

This exhibit will comprise a visual "do it yourself" demonstration of the new, durable antistatic agent, Aston LT.

In attendance: F O Robitschek, president; L P Brick, executive vice president; E I Valko, director of research; G C Tesoro, assistant director of research; P D Jacobs, assistant sales manager, Textile Division; M Schlesinger, group leader, textile evaluation and testing; P B MacLean, New England District sales manager.

Warwick Chemical Company
A Division of Sun Chemical Corporation

10th St & 44th Ave
Long Island City 1, N Y

Booth #9, Basildon Room

Textile chemicals, durable and renewable water repellents, Norane and Impregnole, Prym resins for wash and wear finishes, Suntone pigment printing colors, and silicones.

In attendance: H C Whittemore, vice president and general manager; T F Parsons, manager of converter relations; R L Walter, assistant to the vice president; J R Gimeli, converter relations; H B Goldstein, manager of the Wood River Junction plant; S Nye, head, Application Laboratory; and A H Gower, R G Perriello, A L McArthur, R J Breazeale, A J Picciotti, C Fickinger, A F Costello, technical sales representatives.

General Electric Company
Silicone Products Department

Waterford, N Y

Booth #10, Basildon Room

National Starch Products Inc

270 Madison Ave
New York 16, N Y

Booth #11, Basildon Room

Starch and resin specialties for the textile industry.

In attendance: Ira L Dowdee, David R Lassiter, Howard M Smith, Joseph M Armstrong, Herbert C Olsen, and Edward J Maslanka.

B F Goodrich Chemical Co

P O Box 122
Avon Lake, O

Booth #12, Basildon Room

Metro-Atlantic Inc

Centredale 11, RI

Booth #13, Basildon Room

Finished fabrics pertaining to the Company's line of dyestuffs, resins, water repellents, auxiliaries, etc. Technical literature and color books will be available on request. In addition, emphasis will be placed on the Company's insurance program launched in conjunction with its line of durable water repellents.

In attendance: Joseph Buonanno, president; Hugh Bonino, vice president; Henry Papini, vice president; Bernard Buonanno, assistant vice president; James Shore, technical director; Stuart L Sperber, director of sales promotion; Joseph Weldon, Alfred McGregor, Gerhard Sprenger, Robert Carlson, Walter Sullivan, Joseph C King, George Sarti, William Ianonne, Francis X Minich, Alfred Castka, Harry Kennedy, Everett Clarke, and Edward Sweeney,

International Salt Co, Inc
Industrial Division

Scranton 2, Pa

Booth #14, Basildon Room

Wallerstein Company, Inc

180 Madison Ave
New York 16, N Y

Booth #15, Basildon Room

Exhibit will feature Rapidase. Reception booth, posters, trade literature

In attendance: Frank A Taberski, Jack C Robertson, James J Casserly, and J A Clarke.

ABSTRACTS OF PAPERS

PAPERS OF MONDAY, SEPTEMBER 10, 1956

Morning: 9:30 AM—Empire Room
Topic: **Colorfastness of Textiles**

A CENTURY OF PROGRESS IN COLORFASTNESS TEST METHODS

M L STAPLES
Ontario Research Foundation

In the course of manufacture and in subsequent use, dyed textiles are required to withstand the action of many different agencies. This has resulted in the need for methods of test which can be employed to assess the suitability of dyestuffs for specific applications.

The colorfastness of dyeings has been considered to be important from earliest times. When comparatively few natural dyes were available, control of quality standards was exercised by various guilds or by the State. The discovery of synthetic dyes focussed increased attention on colorfastness, and today a concerted effort is being made to develop test methods which are acceptable internationally.

This paper traces the history of colorfastness testing and refers particularly to progress since the time of Sir William Perkin. It records the contributions made by dyestuff manufacturers and by organizations such as the Deutsche Echtheitskommission, the Society of Dyers and Colourists and the American Association of Textile Chemists and Colorists. Reference is also made to work on the standardization of colorfastness test methods by Technical Committee 38 of the International Organization for Standardization.

The paper concludes with a brief discussion of some of the problems yet to be solved before colorfastness testing will answer fully the questions raised by the complicated needs of the present and immediate future.

THE DEVELOPMENT OF TEST METHODS FOR COLORFASTNESS IN FRANCE

J P NIEDERHAUSER
Compagnie Française des Matieres Colorantes

The problem of colorfastness of dyestuffs has always been a concern of the French Textile Industry, and in France one finds the first requirements for colorfastness since the end of the Seventeenth Century in the Ordonnance to dyers taken by the Minister Colbert.

In our days, the matter is always of interest both to dyeing and printing technicians, particularly for the manufacture of high novelty articles for which France is known.

Thus, the work of the French Commission for Colorfastness, established in 1947 under the auspices of the Textile Institute of France, is being followed with great interest. This commission immediately realized the importance of an international agreement in this field and contacted the Swiss Commission. Since then, the Commission has not ceased to participate in all international organizations which have endeavored to standardize test methods—and particularly in the ISO.

Standards established by this institution have been accepted by the Association Francaise de Normalisation and are now recommended for all controls of colorfastness.

THE STANDARD DEPTHS OF SHADE IN RELATION TO THE ASSESSMENT OF COLORFASTNESS OF DYES ON TEXTILES

PAUL RABE
Farbenfabriken Bayer A G

As the results of colorfastness tests of dyestuffs depend on the depth of shade, such tests are usually carried out on dyeings having a depth of shade defined by a standard of comparison or "standard depth." The standard depth of the ECE (Europäisch-Continentale Echtheits-Convention) is represented by 18 wool dyeings that differ in hue and saturation but which are visually matched with the same depth of shade. In checking the depth of dyeings to be tested for colorfastness against these standards, uncertainties may be experienced because of differences in hue, in brightness, and in the substrate (matt or luster). Thus, there is a genuine interest in the development of an objective method of measuring the depth of shade.

For the development of such a method in the present investigation, the color coordinates of the standards in the CIE color space were determined and the saturation and darkness degree (Dunkelstufe) established according to the system of the DIN (official German Color Standard) chromaticity diagram. It is shown that a mathematical interrelationship exists between the darkness degree and saturation of the standards which permits the establishment of a formula for the depth of shade. Thus, it is possible objectively to establish and determine the depth of the standard.

The color depth formula was first successfully applied in dyeing a second series of standards on lustrous viscose material. In continued investigations, series of standard types in 1/3, 1/6, 1/12, and 1/25 of the standard depth have been established. A visual check of these calculated series of types with reduced depth shows a satisfactory conformity of the color depth of shade over the individual series, as well as of the equal intervals of the series from each other.

CURRENT DEVELOPMENTS IN COLORFASTNESS TESTING: UNITED KINGDOM

P W CUNLIFFE
British Cotton and Wool Dyers Association

The Society of Dyers and Colourists enjoys the close cooperation of the British Standards Institution, which accepted the 150 tests for color fastness and issued them as British Standards in February 1956. Tests recommended by by the SDC have for long been widely used in official specifications in Great Britain.

The Society has devoted much attention in recent years to the test for fastness to perspiration and has put forward suggestions for a modified artificial perspiration liquor containing histidine. This compound behaves as a sequestering agent for copper which occurs in some dyes as a copper-complex and in some agents used for after-treating dyes.

In the sphere of light fastness the Society's members have made considerable progress in their examination of the factors which control fading and in particular on the degree of reproducibility to be obtained in testing with daylight. In examining the action of fading lamps it has been found necessary to go closely into the photo-chemistry of dye failing and considerable progress has been made in understanding the process. This in turn has led to a knowledge of the degree of reliability which can be placed on fading lamps.

Finally, since the SDC played a large part in the development of the Grey Scales, a brief survey of this subject will be made. It will be shown that the concept of a neutral scale of contrasts has arisen from a logical sequence of events in fastness testing and that it can be used satisfactorily to assess all forms of color change. It is likely to remain the principal method of assessment for some time to come.

CURRENT DEVELOPMENTS IN COLORFASTNESS TESTING: USA

CHARLES A SYLVESTER
E I du Pont de Nemours and Co, Inc

The paper discusses recent trends in the development and improvement of test methods by the American Association of Textile Chemists and Colorists. It points up the emphasis that is being accorded to the development of colorfastness tests designed to predict end-use performance. It stresses the effort that is being made to utilize mechanical apparatus in test methods to promote optimum consistency and reduce to a minimum the human factor. The Crockmeter, FDA-R Fade-Ometer, Launder-Ometer, Perspirometer, and stainless steel tubes are mentioned as means of accomplishing this objective.

PAPERS OF TUESDAY, SEPTEMBER 11, 1956

Morning: 9:30 AM—Empire Room

Topic: **The Application of Colorants to Plastics**

THE APPLICATION OF COLORANTS TO POLYSTYRENE AND MODIFIED POLYSTYRENE PLASTICS

GEORGE GODFREY
Koppers Co, Inc

The application of colorants to polystyrene and modified polystyrene plastics is discussed giving engineering and other helpful data. The numerous processing and end-use requirements are noted which influence greatly the choice of colorants used. Coloring agents will be listed that have been found best adapted to these types of plastics.

THE APPLICATION OF COLORANTS TO POLYETHYLENE

FRANK J HINES
Catalin Corp of America

The methods of coloring polyethylene and some modifications which aid in the efficient coloring will be discussed. Colorants of general usefulness and colorants having limited but valuable application possibilities will be presented in table form. The colorant properties essential to top quality polyethylene products will be related to the colorant table. These properties will include heat stability, light stability, bleed resistance and efflorescence. Additional data will be presented on the effect of the colorants on the stability of polyethylene under specified conditions. A short discussion on the effect of colorants and modifiers upon the electrical properties of the polyethylene will be included.

THE APPLICATION OF COLORANTS TO RUBBER AND OTHER ELASTOMERIC PLASTICS

H M WHITACRE
Akron Chemical Co

The application of colorants to rubber and other elastomeric plastics is discussed primarily from the servicing viewpoint, and particularly the manufacturing factors that influence the coloring processes. The properties and specifications will be noted that guide colorists in their selection of colorants for this field, and the coloring agents will be listed which are best adaptable to the engineering and economic requirements of these plastics.

ULTRAVIOLET ABSORBERS IN PLASTICS

W B HARDY and RALPH COLEMAN
American Cyanamid Co

It is desirable that the original appearance of a plastic, whether colored or clear, be maintained. The yellowing of plastics and fading of their coloring agents by sunlight is caused primarily by the energy in the near ultraviolet region of the spectrum. It has been demonstrated that changes in the appearance and physical properties of a plastic caused by sunlight can be effectively retarded by incorporating certain classes of compounds which absorb ultraviolet light.

Several classes of compounds capable of absorbing strongly in the near ultraviolet region will be discussed with particular emphasis on substituted *o*-hydroxybenzophenones. In the case of the latter a detailed description will be given of the effect of various substituents on the absorption characteristics. Properties such as ultraviolet absorption, heat stability and light stability will be correlated with the usefulness of these compounds as light stabilizers for commercially important plastics.

Synthetic approaches to the *o*-hydroxybenzophenones will be outlined. The structure of certain by-products and a mechanism for their formation will be described.

COLORANTS FOR ACRYLIC PLASTICS

S C KELTON, Jr
Rohm and Haas Co

The selection of colorants for acrylic plastics is governed primarily by the requirements of extreme weather stability. These colorless plastics are extraordinarily inert to weather and to reaction with dyes and pigments and, in addition, have nearly perfect optical clarity. These facts permit the formulation of colored products whose permanence is limited chiefly by the stability of the coloring agents. The various processes used for coloring acrylic plastics will be reviewed to derive the essential requirements for satisfactory colorants and these requirements will be illustrated by specific problems met in the development of a wide range of colors.

The application of acrylic plastics to internally lighted signs, to diffuse lighting and to various signal and filter purposes required the development of good methods of measuring color, haze and hiding power contributed by various colorants. These techniques will be illustrated by their use in the instrumental evaluation of weather exposure test panels and the determination of diffusing power ratios for back-lighted panels.

The dyes and pigments found most useful will be summarized and compared with the outstanding deficiencies in the color palette for acrylic plastics in order to suggest objectives for research by colorant manufacturers.

THE PREPARATION AND USE OF SPECIAL POLYSTYRENE COLOR STANDARDS FOR FRESH AND PROCESSED FOOD PRODUCTS

G W INGLE
Monsanto Chemical Co

The preparation and use of polystyrene color standards for grading the quality of fresh and processed food products are described. Importance is attached to the cooperative effort required to develop color matches for these products. These standards retain their color-fidelity under various illuminations and under use conditions destructive to earlier colored paper standards. As such, they represent an excellent example of the impact of synthetic colorants and plastics upon a multi-billion-dollar segment of our economy.

Morning: 9:30 AM—Perroquet Suite

Topic: **The Application of Colorants to Drugs, Cosmetics and Medicine**

THE USE OF COLORANTS AS DRUGS AND IN DRUGS

JACK COOPER
Ciba Pharmaceutical Products, Inc

The use of colors and colored substances in pharmacy and medicine stretches back to antiquity with results more psychological than corporeal. From leaves and bark, soils and stones, insects and worms came the pigments which enlivened the appearance of these remedies. A century ago Perkin introduced the first aniline dye and a new colorful era rainbowed across the field of pharmaceutical practice. The specific staining properties of some of these new dyes made it logical to study their therapeutic potential. Many soon were in use as diagnostic agents, antiseptics or for specific chemotherapeutic effects. Scarlet red, acriflavine and Pyridium® could be found in the prescription files of every pharmacy. As with other commodities, the psychological response of patients to color in their medicines cannot be ignored. Amber syrups, bright red elixirs and pink pills help tide the restless invalid over his "blue" period. The wide choice of synthetic colors gives the pharmacist more elbow room in compounding, but compatibility with other ingredients presents certain difficulties. Unlike other applications, the use of colorants in drugs presents the very special problem of safety. Only specified coal-tar colors may be used in foods, drugs and cosmetics and every batch must be certified. Auxiliary applications of colorants include pharmaceutial analysis and clinical chemistry.

THE USE OF COLORANTS IN COSMETICS

DONALD H POWERS
Warner-Lambert Pharmaceutical Co, Inc

The use of color in cosmetics is entirely different from color in textiles, since no coal-tar color may be used in cosmetics, unless it has been certified in one of three classifications: as a Food, Drug & Cosmetic color; a D & C color; or as an External D & C color. While approximately one hundred thirty coal-tar colors or their lakes or toners have been listed in one of these categories, many of them are not available because commercial batches have not been submitted for certification to the Food & Drug Administration. Recently three colors which were F D & C colors have been reclassified as External D & C colors.

The Federal Food, Drug & Cosmetic Act of 1938 states in Section 601 (e): "A cosmetic shall be deemed to be adulterated if it is not a hair dye and it bears or contains a coal-tar color." In this ruling hair dyes with specific labeling may contain non-certified coal-tar colors, but these hair dyes are the only exceptions.

This country is unique in the extreme precautions taken to guard the colors used in cosmetics. Where two certified colors are mixed to produce a shade, the mixture must be recertified. If it is packaged in small containers, these small packages must be recertified.

In the Xanthene or Fluoran-type color, a number of shades have been certified, such as Erythrosine, Eosine, Phloxine and Rose Bengale, as well as the di- and the tetrabromofluorescein and the tetrabrometetrachlorofluorescein. These colors are particularly important in lipstick formulation. A few Anthraquinones are certified, as well as Indigo and Sulfonated Indigo.

Naturally-occurring coloring matter need not be certified, but the responsibility for the purity of these colors rests upon the manufacturer using them in formulations. While the natural colors have largely been replaced by the coal-tar colors, a few of the natural colors are Annatto, Alkanet, Cochineal, Saffron, Carotene, Chlorophyll and Tumeric. Among the inorganic colors are the iron oxides, carbon blacks, ultra-marine blues,

chrome oxide greens and a number of the white pigments.

Usually the concentration of color runs from .01% up to 1%, occasionally going as high as 3% but rarely higher; however, this low concentration of color plays an important role in the acceptance and growing demand for modern cosmetics.

ANILINE DYES—THEIR IMPACT ON BIOLOGY AND MEDICINE

MORRIS J LEIKIND
Armed Forces Institute of Pathology

The preparation of the first aniline dye in 1856 by William Perkin was a discovery important not only to chemistry, the textile industry and the arts; it was of the highest significance to the advancement of biology and medicine, The discovery came at a time when it could be swiftly applied to the development of the cell theory as a guiding principle in biology. It helped to establish Virchow's doctrine of cellular pathology as a foundation pillar of modern pathology. Microbiology owes much to the aniline dyes; and the science of chemotherapy through the brilliant researches of Paul Ehrlich could hardly have been established until the existence of coal tar dyes and allied chemicals.

Afternoon: 2:00 PM—Empire Room

Topic: **The Application of Colorants to Leather**

THE CHEMICAL AND PHYSICAL NATURE OF LEATHER FIBERS IN RELATION TO DYEING

ROBERT STUBBINGS
Chemistry Department, Lehigh University

The reaction of dystuffs with collagen and leather fibers is presented in terms of the basic chemical and physical structure of the leather mat. The effects of various tanning agents and syntans are discussed in terms of their effect on dye affinity. The general effects of pH on dye binding are shown for various types of leather.

The penetration of dyestuffs into leather is discussed from the viewpoint of the physical structure of the grain layer of the leather. Color slides are shown of various types of penetration in the grain layer of chrome tanned leather.

COLORING OF LEATHERS ON WHICH PENETRATION IS DESIRED

JOSEPH A CASNOCHA
Sandoz Chemical Works, Inc

Leathers such as kid suede, glazed kid, sides, etc, are colored with the ordinary water-soluble synthetic dyestuffs. Since on these leathers penetration or cross-coloring is required, it is achieved by either selecting dyes that possess very good inherent penetration, or by using less penetrating dyes but adjusting the leather and the conditions of application so as to diminish their mutual affinity. Once the affinity is reduced, it is possible to force through the surface layers of the leather even those dyes that have relatively low inherent penetration.

Numerous investigators have assigned the responsibility for inherent penetration to various factors connected with the structure of the dye molecules or the nature of their dispersions. It appears that in each dye there is a combination of a number of contributing factors, but it can be stated with safety and without pinpointing the cause, that the penetration of dyes is inversely proportional to their affinity. The affinity could be reduced by increasing the pH of the dye-leather system, by masking the chromium complex, or by occupying the reactive groups of the leather which will be ordinarily taken up by the dyes, with other substances.

It is up to the colorist to adjust these factors and produce the desired results, as far as color and penetration are concerned, without resorting to any method that would be detrimental to the leather. For example, in the coloring of light shades on side leather, penetration will be achieved by the use of a small percentage of dyes possessing high inherent penetration, while in the coloring of deep shades on crusted suede leather a large percentage of dyes of relatively low inherent penetration will be used, but the leather and the conditions will be adjusted so as to reduce their mutual affinity.

Although the above remarks pertain particularly to chrome tanned leather, the same principles hold true for vegetable and other tannages. On anionic tannages anionic dyes produce weak shades with greater penetration. However, these tannages exhibit a great affinity for basic (cationic) dyes, which, therefore, show only limited penetration.

DYES AND DYEING PROCESSES FOR SPECIAL PROPERTIES OF COLOR

J S KIRK
General Aniline and Film Corp

The demands of the glove, garment and upholstery leather fields, has in recent times placed especial emphasis on properties of color not formerly required in the leather industry. These properties are:

1. Fastness to soap and water washing.
2. Fastness to drycleaning solvents.
3. Lightfastness approaching textile requirements.

These requirements have led to a revision in the selection of the customary leather dyes, and the introduction of dyes and dying processes not generally used in leather. Because these requirements are frequently not met by a single class of dyestuffs, several new groups of dyes and dyeing processes have been introduced in order to fulfill the desired color range. Fortunately, leather properties have been improved by the introduction of new tanning processes so that the newer dyeing processes may be used without detriment to leather properties.

The following classes of dyes have been used to produce the fastness required:

1. Sulfur dyes
2. Azoic or naphthol dyes
3. Leuco esters of vat dyes
4. Chromable direct dyes

The properties of these dye classes differ to such an

extent that individual processes must be used for each type. Consequently, no single method is applicable. Each process is therefore briefly described.

THE SPRAY OR BRUSH DYEING OF LEATHER

C H GEISTER
E I du Pont de Nemours and Co, Inc

A description is given of both hand and mechanical spray and brush dyeing equipment. The dyeing while finishing of "corrected" grain side shoe upper leather is discussed. This includes the selection and use of acid, basic, and spirit soluble dyes in the stain, pigment, and top coats. Lakes and pigments are also used in these finishing processes. The employment of alkalies and dispersing or leveling agents is also discussed. It is shown that an uncolored leather can be dyed while finishing to full shades.

A similar discussion is made of the use of dyes with binders in the glazed finishes for grain calfskin and goatskin leathers.

The use of the spray or brush dyeing processes is described for other leathers. These leathers include suede, white back glove, and the specialty types.

Afternoon: 2:00 PM—Perroquet Suite

Topics: **The Physics of Color**
Color in National Defense
The Impact of Synthetic Dyes on Our Economy

PROGRESS IN MEASURING COLOR DIFFERENCES

G W INGLE
Monsanto Chemical Co

In the last two decades, color-instrumentation has come of age. Beginning with the Hardy spectrophotometer and continuing to the present time, instrumentation for measuring color and color-difference has progressed steadily from restriction to the laboratory to direct utility in manufacturing control.

This advance has not been made without much experimentation and development by instrument designers, manufacturers and users. From the many color-instruments announced during this time, only a few have survived the analysis of study and use. While significant improvements in these useful instruments are necessary and are already being worked upon, a major need is the standardization of reliable procedures for using these instruments at their present stage of development.

The American Society for Testing Materials' Committee D-1 on Paint, Varnish, Lacquer and Related Products has been alert to this need. For several years its Subcommittee X on Optical Properties, through individual groups, one for each instrument, has been testing and improving such procedures. The results of this work are approaching completion and are being prepared for publication as proposals for ASTM Tentative Standards.

At the same time, ASTM Committee E-12 on Appearance Properties of Engineering Materials, through its Subcommittee II on Color and Spectral Characteristics has been considering this problem. Here emphasis has been upon exploring the accuracy of existing formulas for converting instrument readings to values of color difference in relation to the most careful visual estimates. Ultimately, E-12's target is the broadening of these procedures to include *all* engineering materials of interest, as well as further improving their accuracy.

Finally, fertile areas are indicated for further work in measuring color and color-difference.

COLOR CONTROL—25 YEARS PROGRESS

FRANK J O'NEIL
Pacific Mills

An outline is drawn of the steady progress in the development of color controls during the past 25 years. Cooperation between the OSA and AATCC is brought out and particular attention is given the behind-the-scene activity of members of both these societies.

The use of the Hardy Spectrophotometer, and later its counterpart, the General Electric Spectrophotometer, abridged spectrophotometers and colorimeters are described.

Emphasis is given to the more efficient use of the human eye in color control through the study of anomalous color vision, pigmentation of the eye, effect of glare, size of sample, illumination in the matching room, metamerism and other associated conditions.

Arguments in favor of the use of automatic tristimulus colorimetry in certain areas of color control are presented. Reference is made to the benefits derived from repetitive measurements of a colored sample based on a statistical appreciation of the accuracy of match. It is shown that in this phase of the color-matching problem instrumental measurements are superior to the eye.

COLOR IN NATIONAL DEFENSE

STEPHEN J KENNEDY
Headquarters, Quartermaster Research and Development Command

Color has many important roles to play in the national defense of our country. Some are traditional, but many are of recent origin, as the capabilities of the use of color and the opportunities for its application have come to be realized, and as research and development have provided new colorants and ways of using them.

There are many distinct defense applications of color: where it can and does play an important part in the building of esprit de corps of our troops, in the effective employment of our military manpower, in the safety and survival of our troops and in the winning of battles.—Illustrated with a color film.

THE IMPACT OF SYNTHETIC DYES ON OUR ECONOMY

C C CONCANNON
U S Department of Commerce

From earliest times, color has exerted a strong impact on the world's economy. The royal purple of Roman togas, colored with natural dyes, symbolized wealth and power. Today, instead of perhaps a hundred natural dyes we have thousands of synthetic dyes, the ecomomic force of which on our vast modern economy is incalculable. Color affects all phases of our daily lives. The textile industry, our homes and offices, our automobiles, our military establishment, television, and the entire business world use and are dependent upon color.

Perkin's discovery led to the creation of the great organic branch of the chemical industry, which reached its fullest development before World War I in Germany. The efforts of the Germans in that war to deny us colors and the many products associated with the making of synthetic dyes resulted in the establishment in the United States of a coal-tar dye industry and a subsequent branching out into a vast organic chemical complex, which today affects all manufacture,

The importance of this outgrowth was clearly demonstrated in World War II, when the organic branch expanded to heights undreamed of before 1939. During that war the United States undertook to supply other free nations with materials they needed and later helped European and other countries to rebuild their shattered economies. The development of a strong chemical industry, including dyes, which are important to so many aspects of life, is being encouraged as a means of furthering industrialization and improving the standard of living in many world areas.

The organic branch of our chemical industry, stemming back to Perkin's Mauve, accounts for a substantial portion of our total annual chemical output of more than $20 billion, which has had an important part in helping this Nation to reach its $400 billion annual gross national product. But not only in our domestic industry but in our foreign trade synthetic dyes are a leading item. Exports of coal tar dyes totaled $22,883,000 in 1955 and went all over the world, demonstrating in yet another way that chemistry is basic to all industry and that color is the catalyst of commerce.

PAPERS OF WEDNESDAY, SEPTEMBER 12, 1956

Morning: 9:30 AM—Empire Room

Topic: **The Application of Colorants to Food**

THE STRUCTURE AND PROPERTIES OF PRESENT DAY FOOD COLORS

SAMUEL ZUCKERMAN
H Kohnstamm and Co, Inc

In 1906, just fifty years after Perkins discovered the first coal-tar dye Mauve, the first Food & Drug Act was passed. Now, 50 years later we are not only celebrating the Perkin Centennial but also the 50th anniversary of the use of certified coal-tar colors in food.

No other government has guarded with such care the colors that may be used in foods, drugs and cosmetics. Each coal-tar color manufacturer must submit to the Food & Drug Administration samples from every batch to be analyzed for purity before certification and the official lot-test number must then accompany the colors through all subsequent packagings.

The manufacturer of these colors of certifiable purity is a highly specialized branch of the dyestuff industry because extraordinary precautions and controls are necessary to eliminate objectionable side reactions.

Last year over 1½ million pounds were manufactured and certified to the Food & Drug Administration of the United States. Of this approximately 90% were colors of azo (—N=N.) classification and the balance were Triphenylmethanes, Xanthene, Nitro and Indigoid types.

Because color is one of the important tools of the food technologist it should be interesting to see how a knowledge of the chemical structure of these dyes could be employed to predict, to a fair degree, the physical properties of these colors and show the relationship of these physical properties to the molecular structure.

Starting with one of the simplest azo couplings, benzene azo beta naphthol, the effects of group substitution and position isomerism on solubility and shade is discussed both in the soluble and water soluble FD&C azo colors.

The synthesis, similarity in structure and the properties of the triphenylmethane dyes, followed by a discussion of chemistry of the three remaining FD&C colors, FD&C Red #3, an Xanthene dye, FD&C Yellow #1, a nitro dye, and FD&C Blue #2, an indigoid type, will conclude the paper,

THE APPLICATION OF COLORANTS TO FOODS, SUGAR AND CHOCOLATE CANDIES

PHILIP P GOTT
National Confectioners' Association

Colors and those closely related factors such as gloss constitute significant characteristics of sugar and chocolate confections.

The kinds of colors used fall into three groups, namely:

(a) Natural products—ie, sugar, molasses, brown sugar, caramelized milk and cocoa products.
(b) Vegetable and fruit colors—ie, cherry, strawberry, grape, caramel color (made from corn) and edible vegetable carbon black.
(c) Certified food colors.

A discussion of the kinds of colors involves innumerable ramifications of the legal and physiological problems. This phase of the subject will undoubtedly be fully covered in more general analysis as related to the use of colorants in foods for human consumption with only minor reference to specific situations which are peculiar to the confectionery industry.

The *processing* techniques used in securing various

colors and the incorporation of colorants in confections involves the chemistry of food manipulations under innumerable conditions.

These conditions involve changes in a wide range of temperatures, crystalline structure, texture and liquidity of varied solutions of many types of agricultural products such as sweeteners (cane and beet sugar, molasses, honey, corn products). Dairy products (milk, cream, butter, dry milk, condensed milk, etc), nuts and peanuts as well as many fruits (cherries, dates, pineapple, berries),—fats and oils together with flavors and colors,

The eye-appeal or the psychological aspects involved in the use of colorants, constitute the most significant phase of the subject from the standpoint of industry sales. Colors stimulate sales, connote quality and taste and symbolize different occasions such as Saint Patrick's Day and Halloween.

The Confectionery Industry also recognizes the value of colorants in its merchandising, advertising and promotional programs, as well as in the selection of its packaging materials.

THE APPLICATION OF COLORANTS TO MEAT AND MEAT PRODUCTS

HENRY R KRAYBILL

American Meat Institute Foundation and Department of Biochemistry, The University of Chicago

Meat and meat food products that are shipped in interstate commerce must be prepared in Federally inspected plants. Only coloring matter and dyes approved by the Meat Inspection Branch of the United States Department of Agriculture may be used. The natural coloring matters—alkanet, annatto carotene, cochineal, green chlorophyll, saffron and turmeric and certain coal-tar dyes—certified under the Federal Food, Drug and Cosmetic Act have been approved for use under prescribed conditions. These colorants or mixtures of them may be applied to animal or artificial casings, provided there is no penetration of the colorant into the product. When there is evidence of the colorant on the casing, or on the surface of the product if the casing is removed, the label must contain the statement "Artificially colored."

The method of application of colorants and the products to which they are applied will be discussed.

CEREALS AND BAKED PRODUCTS

WILLIAM B BRADLEY

American Institute of Baking

Color in baked foods determines, in a large measure, their acceptability. Color in baked foods is contributed by the natural color of the ingredients, by artificial color—either synthetic or derived from natural sources, and by the browning reaction in the oven. The latter source of color is of primary importance because it not only contributes to the appearance of the product but is also responsible for much of the flavor characteristics of some baked foods. For this reason, different crust colors are sought in different types of bread so that flavor characteristics will be typical of each bread type.

Baked foods are artificially colored to accentuate the positive. Whole grain breads having a darker color than could possibly be contributed by the whole grain flour, assures the consumer that the bread is, in fact, a whole grain bread. The yellowish cast in flour is carefully removed by bleaching for white bread production and then returned to some types of baked foods to increase acceptability. A creamy color of bread crumb accents the "wheaty flavor" or may be used to assure the presence of the butter declared on the label.

As is true in many food industries, such use of yellow coloring material is the subject of controversy. However, such use of color should not be confused with the substitution of an artificial color for a nutritious or expensive ingredient which the consumer might expect a processed food to contain.

SIGNIFICANCE OF COLOR IN DAIRY PRODUCTS

ARNOLD H JOHNSON

National Dairy Research Laboratories, Inc

Color has often been designated by reference to well-known materials. "Cream" or "cream color" is an example of such a color designation drawn from the dairy industry. The yellow tint of milk and cream and the deeper yellow color of butter are due primarily to the carotinoid pigments present in these products, with about 90 per cent of the color being due to carotene and the remaining color due to xanthophyll and zeaxanthin.

Whey from milk contains another pigment, riboflavin, which has only slight influence on the color of milk itself. Milk is relatively uniform in its riboflavin content.

Dairy products vary markedly in the degree of their yellow color. This is because many factors such as feed of the cow, season of the year, or breed of the cow influence milk color. In general the deepest yellow color occurs when the cows are on green pastures or when they eat green feeds. Guernsey cows usually produce milk of yellower color than do cows of the other dairy breeds. Cows of the Guernsey breed are less efficient in converting the ingested carotene in the feed to colorless vitamin A which accounts for the deeper yellow color of their milk. The degree of natural yellow color accordingly has nutritional significance since carotene is the precursor of vitamin A in the body. Butterfat, therefore, varies considerably in yellowness throughout the year. In butter manufacture, however, carotene or certified food colors are sometimes added so that a more uniformly colored product may be marketed.

Processing affects the color of dairy products. Milk is sometimes designated as "blue" because some heat treatments impart this appearance to milk of low carotene content. Heating, especially exposure to high temperatures for short periods of time, may also impart greater whiteness to milk. On continued exposure to high temperatures, browning occurs due to a reaction between milk sugar and milk protein.

CITRUS PRODUCTS

KENNETH H KLIPSTEIN

American Cyanamid Co

Of the various fruits, only oranges are colored for

marketing. In many producing areas of the United States soil and climatic conditions are such as to be conducive to the continued formation of chlorophyll in the fruit as well as in the foliage, with the result that oranges at maturity may not possess the amount of orange pigment in the peel that they do in other regions where the conditions of growth afford a longer period of relative dormancy. Some varieties of orange may contain in them the desired ratio of solids to acid when their peel is quite green, and the Valencia orange may turn green again after it has been yellow, if it is allowed to remain on the tree. The necessity of providing the fresh fruit with an attractive appearance in order to make it esthetically acceptable to the consumer has long been recognized, and efforts toward this end led to the development of the ethylene gas process for bleaching of chlorophyll by scientists of the U. S. Department of Agriculture.

While treatment of the mature fruit with ethylene gas results in the production of a satisfactory degree of coloration in some areas, this is not true of the greater part of the crop in Florida, Texas and Louisiana. For the most part, Florida oranges which are subjected to the de-greening process emerge with only a pale yellow color. It is for this reason that oranges are dyed.

The application of color to oranges commenced on a trial basis in 1934 and gained considerable impetus during the following season. During the 1938-39 season the color now known as FD and C Red No. 32 came into use, and since then has almost completely displaced all others.

The percentage of the total crop that is colored varies from season to season, depending on climatic conditions, and may range from 60% to 75%. While the economic importance of the color-added process is tremendous, its significance to the welfare of the citrus industry cannot be appraised solely in terms of the premium price which colored oranges bring. Since the uncolored fruit is frequently so unattractive to the majority of consumers, purchases of it would almost certainly be greatly curtailed.

Of the some 480 million boxes (1.6 bushels per box) of fresh oranges that have been shipped since the start of the color-added process, about 286 million boxes have been colored.

PSYCHOLOGICAL ASPECTS OF FOOD COLORS FROM THE CONSUMER'S STANDPOINT

DEAN FOSTER
U S Testing Co, Inc

The dominance of vision in man's sensory hierarchy would predict the well-known fact that consumer acceptance of foods and beverages is significantly influenced by color. A conflict between visual and taste impressions often causes a consumer to trust his eyes and ignore his tongue. Without proper color a food will lose identity.

The importance of color reactions to food is illustrated with a number of experiments. Techniques for abstracting out and eliminating color influences are described after which methods for measuring the contribution of color are presented. It is shown that the use of "indirect" methods are often most valuable in predictive testing of consumer response. By directing the consumer's attention to properties other than the one under study is defended as the most valid way of determining its true importance.

In order to indicate the importance of food color from the consumer's standpoint, a variety of foods were studied. In some instances the foods are presented singly for rating, without the special influence of environments such as containers or other foods. In other tests, the environment and comparisons are introduced. From these experiments the correctness of color memory and the importance of association are made apparent.

Control of color quality presents many difficulties, but if the consumer is to be pleased, food processors must strive to maintain a uniformly excellent product from an appearance point of view. The present paper, illustrated with color slides, presents some of the ways of determining how to differentiate the excellent from the less excellent.

Morning: 9:30 AM—Starlight Roof

Topics: **The Psychology of Color**
Color Harmony from Fashion to Industry
The Application of Colorants to Paper

DESCRIPTION OF COLOR

DEANE B JUDD
National Bureau of Standards

Color is the aspect of the appearance of objects and light sources that depends chiefly on the spectral composition of the light reaching the eye of the observer from the object or light source, although light from the surroundings also has an important influence on the perceived color. Interest in describing colors has been particularly great since the discovery by Perkin that dyestuffs, with which to control the colors of objects, could be made synthetically. Colors of opaque objects may most systematically be described in terms of hue, saturation, and lightness, hue varying from red through yellow, green, and blue, back to red; saturation varying from grayish to vivid; and lightness varying between the limits black and white. Colors of transparent objects may be described systematically in the same terms, the only difference being that lightness varies between the limits black and colorless, or as it is sometimes called, water-white. Colors of light sources may be described systematically in terms of hue and saturation as before, but the third variable is brightness varying between perfectly dark and maximally bright, or dazzling.

A method of designating the colors of objects based on systematic description in terms of hue, saturation, and lightness has been developed by the Inter-Society Color Council and the National Bureau of Standards, and is called the ISCC-NBS method of designating colors. The most widely used method of describing colors is by largely unsystematic color names derived from such sources as flowers, fruits, minerals, place names, personal names, and chemical names associated with a pigment or dyestuff. Circular 553 of the National Bureau of Standards defines the ISCC-NBS method of systematic color designations and shows these designations for 7,500 color names.

SEEING LIGHT AND COLOR

RALPH M EVANS
Eastman Kodak Co

The process of seeing is somewhat different from commonly accepted notions. Three sciences are involved in the understanding of its principles and characteristics. All vision of the external world requires light. Light is a physical phenomenon and the principles of its action are described by the science of physics. This light enters the eye of an individual and affects the nerve endings on his retina. From these an electrical current is produced which travels back to his brain. This part of the subject properly falls in the science of physiology. Certain effects produced in the brain follow well defined laws and are quite predictable in nature. These effects are embraced by the science of psychophysics.

After a brief discussion illustrating the part played in vision by these differing types of action, the present lecture is devoted to a carefully illustrated discussion of the way in which the mind interprets the information so received. A distinction is made between form and color vision and it is shown that for the most part what we see depends as much on ourselves and our experiences as on the external reality which the light presents to our eyes. The discussion then turns to the seeing of color and in particular to the seeing of colored objects. By an extensive series of pictures it is shown that seeing is largely a matter of recognition of objects with properties believed to be possessed by those objects. From this it is shown that the mind has the ability to see several things simultaneously at the same spot. It follows that it is not entirely the physical or physiological facts which determine what we see but also to a great extent our knowledge of external reality as supplied by the mind. As the best example of this it is shown how it is possible for a person to see simultaneously objects illuminated by light of a certain color and at the same time see the true colors of the objects themselves. This is one of the most basic types of vision and yet it cannot be predicted from the simple physics of the light or the known properties of the eye.

COLOR IN INDUSTRIAL DESIGN

WALTER C GRANVILLE
Container Corp of America

The mass production of products, like the discovery by Perkin, occurred during the past century and this has given birth to a new profession—industrial design. The aim of the industrial designer is to take an existing or new combination of functions and create an original design incorporating them, appropriate for current manufacturing techniques. Although performance of function still is a basic objective, the appearance of the product has become vital simply because a well-designed item will be bought in preference to one having similar functions but with a less attractive appearance. Good color usage is not only necessary, but in some cases it is the most important factor in creating appeal.

All cultures have appreciated and used color, some have done so extensively. Today we are in a cycle of increased sensitivity and selectivity. Colors make a strong impact on the mind and intellect giving enjoyment and emotional satisfaction. This is the psychology of color.

Advances in the technology of industrial finishes have made possible the mass-production coloring of products, and with automation these features will assume even greater importance. Instead of a few standard colors, we now have almost unlimited color choice. This new freedom from restriction, together with the enjoyment of color, has resulted in a color "binge" which some people believe is at the peak. The author believes it has just started and that color will be a major means by which people will express individuality and counterbalance uniformity. This talk will illustrate with Kodachrome transparencies a few uses of color in this and other countries and discuss current and possible future developments.

COLOR HARMONY FROM FASHION TO INDUSTRY

JOHN F WARNER
D B Fuller and Co

In discussing the topic, "Color Harmony from Fashion to Industry", stress is placed on the significance of Perkin's discovery in making possible the growing influence of color as a styling and merchandising force in our modern world,

The functions of The Color Association of the United States is also discussed and its color services to fashion and industry outlined briefly.

Emphasis is laid on the importance of (1) color forecasting (2) color guidance (3) color coordination and (4) color promotion at all levels of the fashion trades, from producer to retailer. The growing appreciation of color on the part of the consumer is also touched upon.

The increasing influence of fashion colors in various fields of industry is discussed, as (1) home furnishings (2) plastics (3) paints (4) automobiles (5) television and other segments of business, all contributing to more colorful living.

While the greatest stress is placed on the fashion elements of color and its stimulus to creative styling, brief mention is also made of the value of color standards in certain branches of industry and in U. S. Government specifications.

COLOR IN PAPER: RAGS TO RICHES

LEONARD B SCHLOSSER
Schlosser Paper Corp

The use of color in paper and on paper has seen tremendous growth, for its participation in the technical expansion of the dyestuff industry and that of the paper industry itself has lent it twofold impetus. Paper has been a direct beneficiary of the sharply increased color consciousness of the American public, and colored papers have played an important part in industry and in direct contact with the consumer.

The movement of the paper manufacturer away from textiles as a prime fiber supply to new sources of raw material began in the middle of the nineteenth century, and Perkin's discovery of Mauve was contemporary with the early stirrings of the wood pulp giant. The paper industry's recent rapid growth has seen increased use of colored papers in grades that run the gamut of the industry's production, and paper as a carrier of message and carrier of product continues to assist and grow with the world's expanding call for color.

Afternoon: 2:00 PM—Empire Room

Topic: **Pigments and Color Lakes**

THE INFLUENCE ON MANKIND OF COLORANTS IN ORGANIC COATINGS

FRANK P CONNOLLY
John W Masury and Son

It's a long step from the time our caveman ancestor smeared some yellow or red clay on his face and body as an adornment . . . perhaps as a lure for the female of the specie . . . or for protection. Starting with Eve and coming up to the modern actress, the gals have used the influence of colorants with uncanny skill . . . often with devilish cleverness. But, from the beginning of time mere man has been led this way and that by the influence of color . . . the buying of a tie . . . an automobile . . . a yacht. For color is the greatest of all selling appeals . . . whether it be the carmine red lips of a charming lady, or the fire red of an auto.

Briefly, this talk plays the colorful organ of organic coatings.

THE INFLUENCE OF SIR WILLIAM PERKIN'S DISCOVERY ON THE GRAPHIC ARTS INDUSTRY

THOMAS CRAIG
Sun Chemical Corp

When Sir William Perkin opened the door to the coal-tar coloring industry in 1856, the Printing Industry was starting to develop. Prior to that time little color printing was produced and colored pigments were few and mostly of natural origins.

Perkin's discovery encouraged study and experimentation and more and more colors were produced. At the same time developments in printing techniques occurred, all of which stimulated the use of color. In 1880 the half-tone plate appeared by which continuous tone pictures could be reproduced. In 1883 Herbert Ives invented color separation and shortly after 4-color process plates. This made possible full color reproductions in continuous tone. The development of colored pigments was by this time satisfactory for such reproduction.

The improvement in printing methods occurred simultaneously with the discovery of suitable colored pigments and such advancement could not have been made if proper colors had not been available.

ADVANCES IN PHTHALOCYANINE TECHNOLOGY

R E BROUILLARD
General Aniline & Film Corp

One of the major problems in Phthalocyanine Technology has been the tendency of copper phthalocyanine to crystallize in the presence of organic solvents. This deficiency has tended to limit utilization of this very important pigment and has been the subject of intensive research for several years.

Three general techniques have been devised for the control of the crystallization of copper phthalocyanine, these are:

1. Establishment of particular particle size and particle size distribution so as to minimize solubility and establish equilibrium conditions.
2. Deliberate contamination with specific impurities which are capable of arresting crystal growth by absorption on the actively growing crystal face.
3. Appropriate substitution of the benzanoid rings of the phthalocyanine system. It has been shown that to be effective this substitution must be in the 4 or 5 positions and by relatively large atoms such as chlorine. Substitution in the 4 or 5 positions by small moieties, such as the methyl group, are ineffective. Similarly large atoms in the 3 or 6 positions do not stabilize. Available data and theoretical considerations indicate that stabilization by substitution is due to immobilization of the crystal structure. This immobilization prevents the dimorphic transition to the beta form which is a prerequisite to crystallization.

THE ECONOMIC SIGNIFICANCE OF ORGANIC COLORANTS IN COATINGS

NORMAN S CASSEL
Interchemical Corp

Organic pigments stemming from the Perkin discovery have been a great factor in the growth of the coatings industry, and in those industries which utilize coatings. Coatings are bifunctional—protective and decorative. Traditionally the protective function has been stressed. Buildings, bridges, vehicles, machinery have been painted or coated in order to protect from the destructive forces of weather, moisture, abrasion, etc. Before the Perkin discovery, pigments were limited to inorganic compounds and vegetable extracts, and were lacking in color range, permanence and supply. Consequently the decorative aspect of coatings was greatly limited. Compared to today, the myriads of manufactured objects, though reasonably durable, were very dull. Styling and "eye-appeal" were unknown terms.

So as organic chemistry went forward with research and development and brought forth a rainbow of brilliant pigments, a new era dawned for organic coatings. The decorative function blossomed and grew in importance until today we paint to redecorate, we look for beauty as well as the utility of the things we buy. This paper purposes to discuss the impact of these organic pigments upon the coatings industry and its customers.

THE CHEMISTRY OF ORGANIC PIGMENTS

A SIEGEL and W S STRUVE
E I du Pont de Nemours and Co, Inc

Before the discovery of synthetic organic dyes, most pigments were relatively dull inorganic colors, such as the naturally accruing earth colors, although a few organic dyes found in nature such as alizarin and indigo were available. The rapid development of organic chemistry, both in the laboratory and in industry, initiated

by Perkin's synthesis of "Mauve," led to the manufacture of many intermediates and dyes. The pigment industry, as a poor step-sister, used these available compounds for its own uses. Pigments based on triarylmethane colors, such as phloxin and peacock blue, were developed in this early period. The research on azo dyes led to the Lithol reds, toluidine red, Hansa yellows, Lake Red C and Red 2B pigments and to the pigments based on the arylides of 3-hydroxy-2-naphthoic acid. Finally chelates of azo colors, such as "Green-Gold" were developed.

In the 1930's the phthalocyanines, developed in England, caused a revolution in the pigment industries by setting new standards of pigment performance. In spectral range these almost ideal pigments have been limited to the blues and greens. Therefore many vat colors have been used to obtain reds, yellows and violets of better properties than were obtainable with the older azo colors, to meet the increased fastness requirements of the consuming industries.

The physico-chemical aspects of pigment technology have become increasingly important. Polymorphism, particle size and surface alterations have significant effects on many pigment properties.

The pigment field has finally come of age. A better understanding of the principles of color formation, and of the relationship of molecular and crystal structure should allow for new advances in this field.

Afternoon: 2:00 PM—Starlight Roof

Topic: **The History of Color**

COLOR IN RELATION TO THE POLITICAL AND ECONOMIC HISTORY OF THE WESTERN WORLD

SIDNEY M EDELSTEIN
Dexter Chemical Corp

From times immemorial, man's main interest in color has been concerned with the decoration of his own person. The search for dyestuffs and materials to color leather and textiles has played a large part in the political and economic history of the western world.

As widely diverse examples, the speaker will discuss the alum trade, the introduction of cochineal into western Europe, the importation of calicos or 'indiennes' from the east and finally, the discovery and the adoption of the 'chemical' method of bleaching. Economic and political considerations will be emphasized.

COLOR IN ANCIENT TIMES

EARLE R CALEY
Ohio State University

The inherent fondness of man for color undoubtedly was given expression at a very early date, but, with the exception of such simple products as charcoal and earth pigments altered by heat, artificial coloring materials were not made in prehistoric times. This was an achievement of the early civilizations and appears to have first occurred in Egypt. Siliceous glazes for natural stones were the first complex colored materials deliberately manufactured.

Although most of the pigments of the ancient civilizations were suitably prepared natural mineral products, a sizeable minority were manufactured by simple chemical processes. The number and variety of ancient pigments that have been identified by modern investigators correspond very closely to the number and variety listed by ancient authors. A considerable variety of dyes for textiles were known and utilized, but all these were suitably prepared animal or vegetable products. The use of mordants and the addition of essential chemicals to dye baths were skillfully practiced from an empirical standpoint.

The writings of ancient authors indicate an abundant appreciation of color from an aesthetic standpoint but little understanding of color from a scientific standpoint. However, a few sound theoretical ideas on the nature of color were expressed.

COLOR DESIGNATION THROUGH THE AGES

ERNEST R KASWELL
Fabric Research Laboratories, Inc

From the beginning of time man has been conscious of the colors around him—in the sky, and on land and water. As languages developed and man was able to talk and make himself understood, he needed and evolved a color language to describe his color world.

The human reaction to color has always been subjective, based upon psychological response to color stimulus, This response is, of course, directly governed by the physiology of the eye and the brain. Because of its subjective nature, color designation required descriptive terms, and antiquity contains a myriad of adjectives employed in attempts clearly to describe color.

As progress in the arts and languages continued, the need for more precise descriptions of color became apparent, and the classification of color subjectively as well as objectively received a great deal of attention. Color charts and color designation systems were developed. Such well known persons as Chevreul, Brewster, Maerz and Paul, Ostwald, and Munsell contributed to the quantification of color designation with numerical indices.

While this phase of color designation was developing, the physicists, one of the first being Sir Isaac Newton, were able to establish the physical nature of light and thus institute the *science* of color as a counterpart to the *art*. The separation of light into its component frequencies, and the concept of light as energy opened the way for the development of quantitative objective measurements of color almost independent of the subjective basis. Colorimetry and spectrophotometry as scientific methods for color designation are the culmination of man's ability to designate color in consistent and reproducible terms.

PAPERS OF THURSDAY, SEPTEMBER 13, 1956

Morning: 9:15 AM—Starlight Roof

Topic: **The Application of Colorants to Textiles**

APPLICATION OF COLORANTS TO GLASS FIBERS

R F CAROSELLI
Owens-Corning Fiberglas Corp

This is a discussion of the application of color to glass curtain and drapery materials. The main emphasis is placed upon various resin pigment systems and their effects on the soil resistance, fireproofness, washfastness, lightfastness, sewability, wrinkle recoverability, abrasion resistance, appearance, and general performance of glass decorative fabrics. The chemistry of dyeing, finishing, and printing as well as processing techniques are covered in detail. A general study of the coronizing process is presented as well as comparisons with the properties of other textile decorative fabrics. An additive for print systems which will permit printing, either roller or screen, on piece dyed fabrics or fully finished white print goods without the need of subsequent finishing is also described. In addition, recent advances which have led to a reduction in the number of processing steps necessary to properly finish and dye glass fabrics are explained.

INTERNAL APPLICATION OF COLOUR IN THE MANUFACTURE OF MAN-MADE FIBRES

C E COKE
Courtaulds Canada, Ltd and
E I BIRNBAUM, JOHN DEAN, LEON MOODY, L J SHEPS and B F VOWLES

This paper presents a brief historical account of the invention, development, and commercial growth of a number of the more important man-made fibres. It recounts early efforts to incorporate coloured pigments into the liquid or molten mass from which textile fibres are spun. More recent and current methods for production of "dope dyed" man-made fibres are discussed in a general manner,

The importance of pigment particle type and size is indicated in relation to colour yield in "dope dyed" fibres. Methods for obtaining fine pigment dispersions are critically examined.

Various specific methods, depending on the nature of the fibre, are described for incorporating pigment dispersions into man-made fibre dope. The pigments involved are classified as to their chemical nature.

Physical properties of some commercially available "dope dyed" man-made fibres are tabulated and the significance of these properties in terms of end-use performance is discussed.

It is pointed out that internal application of colour in the manufacture of man-made fibres has resulted in a more permanently colourful world than has been available previously. The authors forecast a promising future for this type of fibre.

A bibliography is appended.

IMPROVEMENTS IN DYEING COTTON WITH SULFUR DYESTUFFS

JOHN L CRIST and R E RUPP
Southern Dyestuff Corp

This presentation will consider the general nature and properties of Sulfur dyestuffs—their virtues and limitations, places in the Textile Industry where they may be used to best advantage, as well as placed where they are not suitable.

It will further deal with the Production of and Research Developments in Sulfur dyes, the advances that have been made, and ones that may be expected through research—or are at least within the realm of possibility.

Various procedures for dyeing Sulfur dyes will be reviewed, and recently developed or improved processes with respect to both piece goods and yarn dyeing.

Morning: 9:30 AM—Empire Room

Topics: **The History of Dyeing**
The Manufacture of Synthetic Dyes

THE DEVELOPMENT OF FAST COLORS FOR TEXTILES

F M FORDEMWALT
American Cyanamid Co

In addition to being highly colored and capable of being applied to fibers, a "Fast Dye" should be chemically inert and insoluble. The natural dyes depended upon mordants to obtain insolubility. The early synthetics obtained some fastness on wool and silk by chemical reaction but required mordants for cotton. The first really fast synthetic dyes were the azoics. Several versions of these have been practical but all provide for the application of the components separately, even if in the same bath, followed by coupling within the fiber. The next, and the most valuable, group of fast colors to be developed were the vats. Solubilization is obtained by reduction, with or without esterification. After the soluble form has penetrated the fiber, the insoluble color is reformed by oxidation.

Chemical forces, such as dye-fiber salt formation with the protein fibers or hydrogen bonding in the cellulosics, generally provide less wet fastness. With some synthetics the dye, once inside the fiber, is protected from removal by the hydrophobic nature of the fiber itself. Some aspects of fastness, such as lightfastness, are poorly understood. By continued physical chemical studies of the dyeing processes we can expect a continued advance in our understanding of fastness.

THE DEVELOPMENT OF THE ART OF TEXTILE PRINTING

HERMAN P BAUMANN
American Aniline Products, Inc

The development of textile printing proceeds on three fronts simultaneously—the mechanical, the chemical

and the artistic. Sometimes one or the other forges ahead leaving the others to catch up as best they can. During the long centuries preceding the industrial revolution, the artistic front strode far out ahead. During the busy years from 1780 to 1860 the mechanical front far outstripped the others, and since that time it has been the chemists' turn, starting with the revolutionary discovery by Perkin of the first synthetic dyestuff.

The early printing art, as evidenced by records of the Egyptians, Hindus and Javanese, encompassed wax resists, hand stamping and drawings employing combinations of vegetable dyes in harmonious patterns. The advances in the use of metal salt mordants to fix these vegetable dyes did not reach Europe for many centuries. The earliest European prints employed colored pigments fixed upon the cloth with various varnishes, but the prohibitions against importation of Indian calicos around the beginning of the 18th century fostered home arts. Various print shops were successful, after early failures, in translating the dyers' art of mordanting vegetable dyes to obtain prints which were fast to wear and washing. Block printing gave way to cylinder printing and the Perrotine, and these in turn gave way to the intaglio roller prints. Today we use hardly any vegetable dyes. The technique of textile printing is a function of the chemical nature of complex synthetic dyestuffs.

MODERN TEXTILE DYEING TECHNIQUES

PAUL MEUNIER
E I du Pont de Nemours & Co, Inc

The development of improved methods of dyeing natural and man-made fibers will be discussed with particular reference to continuous operations for the large volume of natural fibers and high temperature dyeing methods for the newer synthetic fibers.

The more important modern continuous dyeing machines, Pad-Steam, Williams unit, Bond machine, and the Thermosol method for dyeing synthetic fibers and their blends will be described. Batch dyeing procedures particularly for the new synthetic fibers will also be included, such as high temperature dyeing of yarns, rawstock, tow, etc., in circulating machines and the Barotor and Burlington pressure machines for piece goods.

AMERICA'S DEBT TO PERKIN

SAMUEL LENHER
E I du Pont de Nemours & Co, Inc

When young William Henry Perkin made mauve in an unsuccessful effort to synthesize quinine, he set off a chain reaction which has had a profound influence on America and the entire civilized world. For that research did more than create a hitherto unknown color. It marked the birth of the modern dye industry.

But that was only the beginning. Perkin's mauve, and the host of other synthetic colors that were soon to follow, brought about a revolution in the coal-tar industry itself, with the result that a number of hitherto unknown coal-tar chemicals were soon available. Thus the coal-tar color industry, itself the offspring of scientific research, in return gave fresh impulse to research—both academic and industrial—by providing new products with which to work and opening up new subjects of theoretical interest.

The American dye industry is a key industry. It not only launched the coal-tar chemicals industry and gave impetus to the various color-consuming industries; it was the forerunner of America's vast synthetic organic chemicals industry which annually turns out some four billion dollars worth of products and provides employment for upwards of 300,000 men and women.

Further, the American dye industry provides this country with a nucleus of men and women who are not only trained in synthetic organic chemistry, but who, because of their acquaintance with the many chemical intermediates used in making dyes, have a versatility and breadth of experience that, in the event of a national emergency, would be indispensable to our country's security.

But perhaps of even greater importance are the varied and strategic uses which have been found for dyes and the thousands of dye intermediates and other products made by our modern synthetic organic chemicals industry. Included among the numerous progeny of this industry are such important, and in some cases virtually indispensable, products as insecticides, weed killers, and seed disinfectants; commercial and military explosives; synthetic rubbers and chemicals to speed the processing of rubber and prolong its useful life; synthetic perfume chemicals; photographic chemicals; synthetic resins for fast-drying, durable finishes; and last, but by no means least, antiseptics, anesthetics, and drugs for the healing of disease.

PAPERS OF FRIDAY, SEPTEMBER 14, 1956

9:30 AM and 2:00 PM—Grand Ballroom
Topic: **The Chemistry of Synthetic Dyes**

EARLY SYNTHETIC DYES

HANS Z LECHER, *Consultant*

The paper tells the story of the empirical preparation and manufacture of the early synthetic dyes; and how, in the sixties, Kekul's and Butlerow's theory of structure and particularly the former's benzene formula paved the way for systematic syntheses. It covers the history up to 1870 when the phenomenal growth of dyestuff chemistry and manufacture began.

The story is enlivened by short biographical sketches of the important pioneers Perkin, Baeyer, H. Caro, Coupier, Girard and de Laire, Graebe and Liebermann, Griess, A. W. Hofmann, Lauth, Lightfoot, Martius, Nicholson, Rosenstiehl, Runge, Verguin, Greville Williams.

The following early synthetic dyes will be dealt with: nitro dyes (picric acid, Manchester Yellow); azine dyes (Mauve, safranines, indulines, nigrosines, aniline black); triarylmethane dyes (fuchsine, methyl violet, Hofmann's Violet, spirit blue, alkali blue); the first azo dyes (aminoazobenzene, Manchester Brown); cyanine; hydroxyquinone dyes (naphthazarine, alizarine), alizarine being the first notable example of a systematically synthesized dye; indigo (up to 1870), first synthesis.

DYES FOR COTTON

WILLIAM W WILLIAMS and DAVID I RANDALL
General Aniline and Film Corp

This paper comprises a brief survey exemplifying the structures of the various chemical classes used as dyes for cotton. As it has for centuries, today cotton still dominates the textile field. Some three-quarters of all fabric constructions consist of cotton or viscose rayon. Dyes for these and other cellulosics are used in proportion. Condensation of the chemistry of about three-quarters of all commercial dyes into a thirty minutes talk is a task imposed upon the authors as well as in the audience.

In order to illustrate the chemical diversity of the compounds used to color cotton, their structural formulae will form the basis of the discussion. Methods of application will be referred to only when prerequisite to proper understanding of important properties. Major syntheses will be indicated as time permits.

DYES FOR ANIMAL FIBERS

JAMES OGILVE
National Aniline Div, Allied Chemical and Dye Corp

Sir William Perkin's researches not only led to the founding of the synthetic dyestuffs industry but also greatly influenced its development. Thus his discovery of the synthesis of Alizarine in 1869 opened up the possibility of a large range of valuable chrome and acid wool dyes based on anthraquinone. The fecundity of this field, especially in acid wool dyes derived from arylido anthraquinones, has been notable, and commercially important members of this class continue to be discovered.

Most of the early anthraquinone chrome dyes which were in such great demand before World War I have now been displaced by chrome dyes of the azo class which are more easily applied.

Since 1875 when Caro pointed out the commercial value of the azo coupling technique, the expansion of the azo dyes class has been continuous and extraordinary. It now includes the largest number of dyes used to color animal fibers.

The discovery of a large range of naphthol and naphthylamine sulfonic acids in the latter part of the 19th century greatly facilitated the synthesis of new azo dyes. The alacrity with which these new intermediates were utilized commercially as coupling components is evidence of the remarkable inventive skill of this period.

Some of the earliest and structurally simplest mono azo dyes are still among the most important acid dyes for wool.

The synthesis of azo chrome dyes which can be applied simply and without detriment to animal fibers constitutes one of the most recent and ingenious advances in tinctorial chemistry.

Sir William's synthesis of cinnamic acid facilitated the development by von Baeyer of the first process for the manufacture of Indigo which is still an important wool dye.

His discovery of Mauve, the first synthetic aniline dye, opened up the field of azine dyes and the process whereby he made it led indirectly to the discovery of the class of triphenylmethane dyes which, together with the xanthene class, includes the most brilliant dyes for animal fibers.

Numerous examples are given to illustrate the progress in synthesis of dyes in the Anthraquinone, Azo and Miscellaneous fields.

FLUORESCENT WHITE DYES

R S LONG
American Cyanamid Co

Fluorescent white dyes, or optical whitening agents, are a class of compounds which combine the two properties of substantivity for textiles and fluorescence in the violet to blue range. Their discovery has added a new dimension to the palette of the colorist, permitting him to vary brightness as well as hue.

A brief presentation will be given of the optical properties required in these dyes. This will be followed by a description of the five principal chemical classes which have found commercial acceptance. Examples of typical fluorescent dyes in each class, with the more common synthetic approaches to each, will be shown. Certain interesting relationships between structure, fluorescent wavelength and substantivity will be discussed.

DYES FOR NONTEXTILE COLORATION

MELVIN A PERKINS
E I du Pont de Nemours and Co, Inc

This paper describes and summarizes the more important uses of dyes and pigments for purposes other than coloration of textiles. The chemistry involved in these applications is discussed as well as that of the dyes or pigments themselves. The fields of application concerned here include: advertising signs, aluminum foil, carbon paper, detergents, duplication processes, films, gasoline and oil, inks, lakes, leather, paint, paper, photography, plastics, smokes, stains.

The items of lakes, leathers, paint, photography and plastics will be touched on very lightly because other papers deal with these subjects more fully.

Broadly speaking, non-textile coloration involves two types of dyes; (1) those which dissolve in the application medium or during at least one step of the process and (2) those which serve only to pigment the mass or its surface. Most of these dyes are used to obtain a striking effect because of high tinctorial strength and brilliance. For this reason, permanence is often, though not always, of secondary consideration. However, in certain cases high resistance to heat, light, solvents, etc. is required. Low cost is highly desirable and the coloration often must be achieved on rapidly-moving production lines in materials being produced in quantity. This means that the dye application must be almost instantaneous yet uniform, and "development" or fixation of the dye must be very rapid.

Nearly all the chemical classes of dyes or pigments are involved in these non-textile applications, with outstanding representatives (being the exception rather than the rule) selected for commercial use because of an unique combination of the attributes mentioned above.

DYES IN PHOTOGRAPHY

L G S BROOKER and P W VITTUM
Eastman Kodak Co

Dyes had no place in the earliest photographic processes, and the sensitivity of the silver salts used did not extend beyond the blue region of the spectrum. In 1873 it was discovered that certain dyes were capable of transferring the energy which they absorbed to the light sensitive silver salts (dye sensitization), thereby extending the range of colors to which such salts were sensitive, and for the first time introducing the possibility of an accurate tonal rendition of colored objects. Thereafter dyes began to play an increasingly important part in photography. For the next quarter of a century dyes selected from many classes found use as sensitizers. Attention then became concentrated on the cyanine and related classes, the first of which had also been discovered in 1856, by C. Greville Williams. Today, cyanines continue to provide the most effective sensitizing dyes, and with their aid a wide variety of sensitizations are possible. Three important types may be distinguished: cyanines proper, merocyanines and more recently, undissociated cyanines.

Dyes serve a number of additional functions in photography. Besides being used in antihalo and filter layers, and to a small extent as desensitizers, they are used for forming colored images in the various processes of color photography, a use which has grown phenomenally in recent years.

In virtually all modern color photographic processes, color is rendered by means of three dye images colored cyan, magenta and yellow respectively. One widely used method for producing these dye images comprises the synthesis of indoaniline and azomethine dyes *in situ* during processing.

Another type of color process depends on the successive transfer of dyes from a set of three matrix images, for which purpose water-soluble acid dyes of the azo and anthraquinone series are generally used.

DYES FOR THE HYDROPHOBIC FIBERS

H E SCHROEDER and S N BOYD, Jr
E I du Pont de Nemours and Co, Inc

The commercialization of the hydrophobic fibers has necessitated the development of entirely new classes of dyes. This job has been accomplished successfully by the careful tailoring of dye molecules to the chemical and physical requirements of the different fibers.

All of the hydrophobic fibers designed for apparel use can be dyed with disperse dyes. Polyamide and acrylic fibers can be dyed with acid dyes. Selected acrylic fibers can be dyed also with basic dyes. The dyeing of hydrophobic fibers with disperse dyes involves solution of the dye in the fiber; electrostatic interactions are involved in the dyeing of these fibers with ionic dyes. The rate of dyeing with both the disperse and the ionic dyes is largely a function of the specific fiber and the molecular size and geometry of the dye molecules. The polarity of a disperse dye plays a major role in determining the affinity of the dye for a specific fiber.

Resistance of both the disperse and the ionic dyes to removal from the fiber by aqueous treatments is directly proportional to the affinity of the dye for the fiber and inversely proportional to the rate of dyeing. The washing fastness of the extremely hydrophobic fibers is excellent with all of the dyes which are applicable.

The photochemical decomposition of a dye on a fiber is a reaction of the electronically excited dye molecule with the fiber and/or other elements of the environment. Hence, light-fastness is a characteristic of the particular dye/fiber system.

Many correlations of affinity and fastness properties with molecular structure can be drawn.

PAPERS OF SATURDAY, SEPTEMBER 15, 1956

Morning: 9:30 AM—Grand Ballroom
Topic: **Theories of Dyeing**

THEORY OF DYEING PROTEIN AND POLYAMIDE FIBERS

MILTON HARRIS
Harris Research Laboratories, Inc

Dyeing is a process that has been used for thousands of years, but even today industrial use involves considerable empiricism. However, with the advances that have been made in understanding of the morphological and molecular structures of fibers have come corresponding advances in understanding of the dyeing process. The protein and polyamide fibers, and wool in particular, have been the subject of numerous precise investigations, and in many respects, the mechanisms involved in the dyeing of these fibers are better understood than those for other types of fibers. Some of the features of the chemical and physical architectures of protein and polyamide fibers which influence fundamental as well as practical approaches to dyeing will be discussed.

THE THEORY OF THE DYEING OF CELLULOSIC FIBERS

EMERY I VALKO
Onyx Oil & Chemical Co

The century which has elapsed since Perkin's discovery of Mauvein has seen uninterrupted progress in the synthesis of dyes, to which many hundreds of chemists made important contributions. The theory of dyeing, ie, the knowledge of the laws which regulate the absorption of the dye molecule of the fiber, was developed by a handful of chemists only in the last quarter of that century. As a result of their studies, the theory of cellulosic dyeing has reached a very satisfactory stage. Rate of dyeing can be described in terms of diffusion of dye molecules into the accessible portion of the fiber, and equilibrium of dyeing can be described in terms of molecular attractive forces between fiber molecules and dye molecules. Presently available knowledge of the molecular attractive forces, not only as they are active in the dyeing process but as they are active in many other and simpler chemical phenomena, imposes a severe limitation on the theory, and for the time being, at least, prevents the prediction of the correlation between the molecular structure of dyes and their affinity to the fiber. The salt effect is explained in terms of the

(*concluded on page P647*)

BIOGRAPHIES OF AUTHORS AND PRESIDING OFFICALS

WILLIAM D APPEL

William D Appel has been chief of the Textiles Section of the National Bureau of Standards since 1929 and also assistant chief of the Division of Organic and Fibrous Materials since 1954. He joined the staff of the NBS in 1922 after five years experience in the dyestuff industry. He is the author of numerous technical papers on dyes, textiles, and colorfastness.

Mr Appel was president of the American Association of Textile Chemists and Colorists, 1944-46, and received its Olney Medal in 1954; chairman, Dye Division, American Chemical Society, 1931-35; chairman, Committee D-13 on Textiles, American Society for Testing Materials 1950-1956; life member and fellow, Textile Research Institute, since 1949; leader, USA delegations to meetings of the Technical Committee on Textiles, International Organization for Standardization in England in 1956 and 1951. He is an overseas fellow of the Society of Dyers and Colourists and a member of a number of other technical and scientific societies.

He was graduated from the University of Chicago in 1917 with honors in chemistry and zoology.

M L STAPLES

M L Staples was graduated in 1934 in honour chemistry from the University of Toronto and received the MA degree the following year. After two years in the chemical field, he joined the staff of the Textile Department of the Ontario Research Foundation and is now assistant director of this Department.

During the past twenty years Mr Staples has been interested in a wide variety of textile problems which have included methods of testing, the control of quality and development of performance standards, the dyeing and finishing of fabrics and textile research of a more fundamental nature. He has been an active member of Committee D-13 of the American Society of Testing Materials for eighteen years and is chairman of Subcommittee B-1 on Chemical and Performance Test Methods. He is also active in Subcommittee H on Textile Test Methods of the Canadian Government Specifications Board and was the Canadian delegate to the meetings of Subcommittees 1 and 2, Technical Committee 38 of the International Organization for Standardization held in Scarborough, England in 1954.

He is a member of The Textile Institute, the American Association of Textile Chemists and Colourists and the Textile Society of Canada.

JEAN-PAUL NIEDERHAUSER

Jean-Paul Niederhauser, chemical engineer, was graduated from the Ecole National Superieure de Chimie (Higher National School of Chemistry) in Paris with a Bachelor of Science degree. He is a recipient of the Croix de Guerre (War Cross), 1939-1945.

Mr Niederhauser has been with Compagnie Francaise des Matieres Colorantes (French Dyestuffs Company) as engineer since 1946.

He is a member of the Commission for Colorfastness at the Textile Institute of France and was a French delegate to ISO meetings in Bournemouth in 1951, New York (1952) and Scarborough (1954).

PAUL RABE

Paul Rabe was born June 30, 1892, at Hamburg, Germany. After attending the local high school he received his doctor rer nat degree in January, 1921 at the University of Hamburg. On April 15, 1921, he found employment with the Farbenfabriken Bayer AG. He has been in charge of the scientific dyestuffs laboratory since 1925. He is a member of the G D Ch, the VTCC, the German Fastness Test Committee, the AATCC, and the working committee of the ECE.

P W CUNLIFFE

P W Cunliffe was graduated from King's College, University of London with a B Sc (honors chemistry) in 1920. His studies were interrupted by World War I in which he served as pilot in the Royal Naval Air Service. He continued his studies at King's College and took a Ph D in photochemistry in 1922.

Dr Cunliffe joined the British Cotton and Wool Dyers' Association Ltd as head of research laboratories in 1936. Prior to that. he had served from 1922-28 as a photochemist at British Cotton Industry Research Association.

In 1928 he was appointed by Society of Dyers and Colourists to investigate the fastness of colored textiles to light and to washing, culminating in the establishment of tests for these agencies in 1934. For these services he was awarded the Silver Medal of SDC in 1934.

In period 1922-1934 Dr Cunliffe authored numerous papers relating to the fastness of colored materials to light and washing, and a series of papers on the application of color measurement to fastness problems using the Guild trichromatic colorimeter.

Dr Cunliffe has had continued association with fastness tests and in 1951 became chairman of Fastness Tests Co-ordinating Committee. Between 1944 and 1950, he served as chairman on three committees of Society of Dyers and Colourists dealing respectively with the dyeing properties of direct, cotton, vat and wool dyes.

In 1950 was awarded the Gold Medal of the SDC for outstanding services to the Society and to the tinctorial and allied industries. In 1955 was awarded a bar to the Gold Medal, the first time that a bar had ever been attached to this award.

In 1955 was also awarded the Medal of the Textile Institute, the citation of which is "for distinguished services to the textile industry in general and to the Institute in particular."

CHARLES A SYLVESTER

Charles A Sylvester is head of the Dye Properties Division, Technical Laboratory of E I du Pont de Nemours and Company, Inc., in charge of colorfastness testing.

After attending the University of Delaware and Beacom College, he joined the staff of the Technical Laboratory in 1928.

Mr Sylvester is chairman of the Technical Committee on Research, AATCC, and vice-chairman of the Executive Committee on Research. He is also a member of the Society of Dyers and Colourists.

SIR ROBERT ROBINSON

Sir Robert Robinson is one of the world's greatest living chemists. Many scientific achievements and honors are associated with his name, among them the 1947 Nobel Prize for Chemistry.

His work has been concerned with the chemical constitution of the coloring matters in plants and the synthesis of the pigments occurring in flowers and blossoms. He developed a method of synthesizing tropinone, a relative of atropine—an alkaloid used in medicine, for example, to enlarge the pupil of the eye before examination. He contributed importantly to defining the arrangement of the atoms in the molecular structures of morphine and other alkaloids found in poppy seeds. Sir Robert played an important role in the production of antimalarial drugs in World War II.

From 1930-1955 he was Waynflete professor of chemistry at Oxford. Now connected with the Shell Chemical Company, Limited, his career in industry goes back to 1920 when he was director of research of the British Dyestuffs Corporation.

Sir Robert was knighted in 1939. He is a commander, Legion of Honour, DFC Victoria, and has received honorary degrees from universities in England, Ireland, Wales, Scotland, France and Spain.

He holds the Franklin Institute's Franklin Medal, Albert Gold Medal RSA, the Copley Medal, the Paracelsus Medal of the Swiss Chemical Society, the Royal Medal, Davy Medal, and Longstaff Medal.

He has been president of the British Society for the Advancement of Science, the Royal Society and the Chemical Society. He is an honorary member of the Chemists' Club, New York.

LEONARD S LITTLE

Leonard S Little retired January 31, 1951, as manager of the Textile Service Section, Organic Chemicals Department, E I du Pont de Nemours & Co, Inc, under the company's retirement policy. He is now a chemical-textile consultant with the Better Fabrics Testing Bureau, and is also associated with Du Pont as a consultant.

Mr Little has spent his entire business career in the dyeing and finishing and related chemical industries, since being graduated from Brown University in 1907, where he majored in chemistry.

Among his numerous activities, Mr Little is a representative of chemical manufacturers making water repellents and past chairman of the advisory committee to the Federal Trade Commission on water repellency.

He has been active in the American Association of Textile Chemists & Colorists, being a past chairman of the Executive Committee on Research, which he organized in 1941. Mr Little is also a past governer of the American Association of Textile Technologists.

He has been a member of the American Chemical Society for many years, a member of the American Society for Testing Materials, the American Standards Association in which he represents the Synthetic Organic Chemical Manufacturers Association, the Textile Research Institute, the Textile Institute and the Society of Dyers & Colourists.

He has advised the Southern Regional Laboratory of the US Department of Agriculture on research projects for a number of years.

CHARLES W DORN

Charles W Dorn retired as director of the Research Laboratory, J C Penney Co, Inc, on July 1, 1956, after 27 years with the Company. He is now a textile consultant.

Mr Dorn, a graduate of the University of Louisville, has been very active in various professional organizations. With AATCC he is currently serving as chairman of the Executive Committee on Research and a member of the Joint Committee of AATCC and the American Society for Testing Materials, which determines policies of research for the two organizations. He also represents AATCC and the National Retail Dry Goods Association on various committees of the American Standards Association. Chairman of NRDGA's Technical Committee, Mr Dorn is a recipient of that Association's Silver Plaque for distinguished service to retailing in the field of textile research.

Mr Dorn is a member of Textile Research Institute; a member of ASA's Standards Council and vice chairman of its Consumer Goods Committee; a member of the Steering Committee of International Organization for Standardization, Division of Textiles; and a past collaborator, Cotton Chemical Finishing Division of the Southern Regional Research Laboratory, US Dept of Agriculture. He is chairman of the standing committees for the US Dept of Commerce's Commercial Standards 59-44—Textiles, Testing and Reporting, and 191-53—Flammability of Clothing Textiles, and chairman of the Industry Advisory Committees to the Federal Trade Commission on Water Repellent Fabrics and Rainwear and Shrinkage of Wool Products.

Mr Dorn within recent years has participated in two open-shot Atom Bomb tests studying textiles, namely Operation Doorstep in 1953, and Operation Cue in 1955.

WILLIAM H PEACOCK

William H Peacock received his BS degree from Cooper Union, and has taken post graduate courses at Brooklyn Polytechnic Institute, and Columbia and Rutgers Universities. He has served as lecturer and instructor on plastics and colorants at Rutgers University and for the New York City Board of Education, and is the author of many articles and a book on the uses of colorants. He was assistant superintendent of dye manufacturing for the Holliday-Kemp Company, and has been with the American Cyanamid Company since 1923, in charge of various laboratories connected with colorant applications and currently is a research fellow with special projects in the plastics fields. He is a member of several of the research groups of The Society of The Plastics Industry.

W B HARDY

William B Hardy received his BS degree at the University of Chicago in 1938 where he was a University fellow until receiving his PhD degree in 1940. In the same year he joined the American Cyanamid Company as a research chemist. He is presently manager of the Chemicals and Intermediates Research Section at the Bound Brook (NJ) Laboratories. His research activities have been concerned with dyes, intermediates, rubber chemicals, agricultural chemicals and chemicals for the plastics industry.

RALPH A COLEMAN

Ralph A Coleman received a BS in chemical engineering from Northeastern University in 1941 and a PhD degree from Ohio State University in 1951. He was a chemist in the research section of Naugatuck Chemical Division of the US Rubber Company from 1941 to 1946. Since 1951 he has been a research chemist for the American Cyanamid Company at Bound Brook. His research activities have been concerned with rubber chemical, dyes, ultra-violet light absorbers and chemicals for plastics.

HAROLD M WHITACRE

Harold M Whitacre received his BS degree at Mount

Union College in 1929, and from the Ohio State University received an MS degree in 1931, and PhD degree in chemistry in 1933. He was employed with the Firestone Tire and Rubber Company from 1933-1939, and 1939 to date, with the Akron Chemical Company, and currently holds the office of vice president of that company.

GEORGE W INGLE

George W Ingle received his AB degree in chemistry in 1938 from Colgate University and his MS degree in 1940 from The Institute of Paper Chemistry. He has been with the Plastics Division of the Monsanto Chemical Company from 1940 to date, serving as control chemist, color physicist, color laboratory supervisor, operating superintendent of plant laboratories, research group leader, and is currently section leader, Polystyrene Section, Research Department.

FRANK J. HINES

Frank J Hines received his BS degree from the University of Scranton in 1939. From 1939 to 1954 he was with the American Cyanamid Company as a colorist, assistant laboratory manager and as technical field service representative on colorants in the plastics field. Since 1954 he has been chief color development chemist for the Catalin Corporation of America.

GEORGE J GODFREY

George J Godfrey received his BS in Chemistry degree from the University of Michigan in 1940. He served in the Chemical Warfare Service in Alaska during 1942-1945. He has served as color chemist for Union Printing Ink Company and Hellmuth Printing Ink Company, and assistant director of the Color Laboratory for the Celanese Corporation. From 1948 to date he has held various supervisory positions with the Koppers Company and is currently manager, Color Section, at their Chemical Division's Kobuta, Pa, plant.

JACK COOPER

Jack Cooper, director, Pharmacy Research Development Division, Ciba Pharmaceutical Products, Inc, received his PhG from Columbia University College of Pharmacy. He also did graduate work at New York University and Brooklyn College.

He is a fellow of AAAS and a member of American Pharmaceutical Association, New York Academy of Sciences, Research Society of America, and Federation Internationale Pharmaceutique.

MORRIS C LEIKIND

Morris C Leikind received his training at the Ohio State University, Harvard, The Johns Hopkins School of Hygiene and Public Health, and the Johns Hopkins Institute of the History of Medicine. He has served as consultant in science and then as science specialist in biology and medicine at the Library of Congress. Mr Leikind is now Chief of the Historical Research Division in the Medical Museum of the Armed Forces Institute of Pathology in Washington, DC. He also teaches a course on the history of biology in the US Department of Agriculture Graduate School and serves as special lecturer on the history of microbiology at George Washington University.

ELL DEE COMPTON

Ell Dee Compton, research director, Eagle Ottawa Leather Co, since 1952, received his ChE from the University of Cincinnati in 1939 and his PhD in 1942. Following his graduate and post-doctorate work in tanning research, he served as group leader, leather application research, product and process development, statistics, Merrimac Division, Monsanto Chemical Co, 1947-1952.

ROBERT STUBBINGS

Robert Stubbings, a research assistant professor in the Chemistry Department at Lehigh University, received his PhD degree from this department in 1949. He has been doing research in the field of leather technology since 1946 and in May of 1953 he became director of the Division of Leather Technology at Lehigh. He has published many technical articles in the field of leather technology in the United States and abroad.

Dr Stubbings is a member of Sigma Xi, American Institute of Chemists, International Society of Leather Trades Chemists, and the American Leather Chemists Association.

C H GEISTER

BS in Industrial Science 1920, and MS in Chemical Engineering 1923, Iowa State College. Fellow, Mellon Institute of Industrial Research, Pittsburgh, Pa, 1923-1936. In absentia as technical manager, Robert H Foerderer, Inc, Philadelphia, Pa, 1930-1936. Head, Leather Division, Technical Laboratory, Organic Chemicals Department, E I du Pont de Nemours & Co, Inc, Wilmington, Delaware 1936. Member ALCA since 1930. Sales service and development work on dyes and chemicals for leather.

J S KIRK

J S Kirk has been associated with the leather industry for the past thirty years both in an active participation and in research for the industry.

He obtained his BS degree from Pennsylvania State University in 1924 and PhD degree from Cornell in 1931. He started his leather career at the firm of J E Rhoads and Sons, subsequently worked with Du Pont and then Burk Brothers. In 1948 he accepted a position with General Dyestuff Corporation as Leather Department head. When General Dyestuff became a division of General Aniline & Film Corporation, he was transferred to Rennsselaer to take charge of technical phases of the Company's operations in Leather.

FRANK J O'NEIL

Director of the Physical Dept, Pacific Mills, Craft Fabrics Division, Frank J O'Neil is responsible for the establishment of test methods and sampling procedures used in the maintenance of quality.

After study at Lowell Technological Institute and Massachusetts Institute of Technology he participated as a special lecturer in the Textile Technology and Physics Departments at MIT.

Mr O'Neil is a member of numerous technical societies and committees. He is currently chairman of the AATCC Color Committee.

Color control has been a specialty of Mr O'Neil's for many years. He has written papers and lectured widely on the subject.

CHARLES C CONCANNON

Charles C Concannon, a graduate of Harvard, AB 1911, concentration in chemistry, with other courses in

economics and government, was in private industry for five years selling industrial chemicals in New England and for five years in sales and managerial capacity with the various enterprises of the Takamine Laboratory of New York and Tokyo. Appointed by Herbert Hoover in 1922 to the Bureau of Foreign and Domestic Commerce, he organized the Chemical Division and was its chief until recently, now being consultant on international affairs.

He has traveled extensively throughout the world and has attended many international conferences, being chairman of the US official delegation to the International Congress of Chemistry in Rome, 1938; was US Government delegate to the International Labor Organization at Geneva; and for extended periods was on loan from this Government as advisor to the Governments of Chile and of Peru. His latest foreign assignment in 1955 was as Chief of the US Trade Mission to Pakistan.

He has written many books and articles in chemical and related fields having to do with economics, industry, and foreign trade.

Mr Concannon is a fellow of the American Institute of Chemists and of the American Association for the Advancement of Science, and a member of the American Chemical Society, the American Marketing Association, and of the Society for the Advancement of Management.

BERNARD E PROCTOR

Bernard E Proctor received his BS and PhD degrees from Massachusetts Institute of Technology.

He currently holds the positions of professor, food technology, MIT; director, Samuel Cate Prescott Laboratories of Food Technology, MIT; and head, Department of Food Technology, MIT.

Dr Proctor is a past president and founder of the Institute of Food Technologists, and has served as chairman of various committees of IFT. He has served, both as chairman and member of an extensive number of committees and subcommittees in several related fields.

During World War II Dr Proctor served as an expert consultant on foods to the Secretary of War; also director of subsistence and packaging research and development, Office of the Quartermaster General, Washington, DC.

SAMUEL ZUCKERMAN

Samuel Zuckerman, plant manager, H Kohnstamm & Co, Inc, has been with the firm since 1936. He received a BS degree from CCNY in 1937 and MS and PhD degrees from the Polytechnic Institute of Brooklyn.

Dr Zuckerman is a frequent lecturer to food, drug and cosmetic groups and associations on the chemistry and application of certified coal tar colors.

His professional and commercial activities include: American Chemical Society; Program Committee chairman New York Pigment Club; Society of Cosmetic Chemists; board of directors, Cosmetic Industry Buyers and Suppliers; Brooklyn Chamber of Commerce; Sigma Xi; Phi Lambda Epsilon; Institute of Food Technologists.

PHILIP P GOTT

Philip P Gott has served as president of the National Confectioners' Association since 1941.

He received his AB from Oberlin College in 1915 and his AM from Columbia University in 1917.

Professional Associations: American Bar Association; New York State Bar Association (Food and Drug Division); American Trade Association Executives; Washington Trade Association Executives; Trade Association Executives Forum of Chicago; American Statistical Association; American Marketing Association; American Economic Association; Chicago Association of Commerce and Industry; Public Relations Society of America; Institute of Food Technologists; Research and Development Associates Food and Container Institute; The Quartermaster Association.

HENRY R KRAYBILL

Education: BS, The Pennsylvania State University; MS and PhD, The University of Chicago.

Positions: Director, Department of Scientific Research, American Meat Institute, and professorial lecturer, Department of Biochemistry, The University of Chicago since 1941; vice president of the American Meat Institute Foundation since 1955; director of Research and Education, American Meat Institute Foundation, since 1947. Advisor to US Trust Company, Trustees for Frasch Foundation, 1938-1945; and consultant to Chief of ECA mission to Greece, 1949.

Offices Held in Scientific Organizations: Former President of the Association of Official Agricultural Chemists, the American Association of Feed Control Officials, and the American Society of Plant Physiologists. Also a former chairman of the Division of Agricultural and Food Chemistry, American Chemical Society.

Research Activities: Meat processing. oils and fats, antioxidants, phosphatides, sterols, and effect of processing on nutritive value of meat.

WILLIAM B BRADLEY

William B Bradley, director of research and service laboratories of the American Institute of Baking from June, 1945, was named scientific and research director for the Institute in October, 1949. His appointment to the position made it possible for him to represent the Institute in matters of scientific interest concerning all branches of the baking industry.

At Northwestern he earned a Bachelor of Science degree in chemistry, and a Master of Science and Doctor of Philosophy in physiology, pharmacology and biochemistry.

He was associated with the Wyoming Agricultural Experiment Station for several years and subsequently served on the American Medical Association Council on Foods and Nutrition.

Professional affiliations: American Chemical Society, American Physiological Society, American Association of Cereal Chemists, American Association for the Advancement of Science. Member of the Industry Advisory Committee of the Nutrition Foundation, Cereal and Baked Products Committee of the Quartermaster Advisory Board, Cereal Committee of the Food and Nutrition Board of the National Research Council. Program Chairman for the Annual Meeting of the Associates of the Food and Container Institute.

ARNOLD H JOHNSON

Arnold H Johnson has been with National Dairy Research Laboratories, Inc, since 1929, successively as a research chemist, assistant director of research, director of research and vice president, and president. He is also a vice president and director of Aralac, Inc.

Dr Johnson received his BS from the University of Minnesota in 1921, his MS in 1923 and his PhD in 1924.

He is a member of the American Dry Milk Institute (which awarded him the C E Gray award in 1946), ACS, AAAS, Institute of Food Technologists, American Association of Cereal Chemists, American Oil Chemists

Society, American Dairy Science Association, New York Academy of Sciences, Association of Research Directors, and the Industrial Research Institute.

KENNETH H KLIPSTEIN

Kenneth H Klipstein is general manager of American Cyanamid Company's Research Division. He has been in charge of the Company's research activities since 1954, when they were brought together in one division.

Mr Klipstein joined Cyanamid in 1933. During 1951 and 1952, Mr Klipstein was on loan to the National Production Authority in Washington, DC, first as director of the Chemical Division, and then as an assistant administrator in charge of the Chemical, Rubber and Forest Products Bureau.

He was graduated from Princeton University in 1921 with an AB in economics. He received his MA in chemistry in 1924.

In 1953 Mr Klipstein received the annual award of the Commercial Chemical Development Association for outstanding work in the field of developing commercial products. Among his professional memberships are: AATCC, ACS, American Institute of Chemists, American Institute of Chemical Engineers, Commercial Chemical Development Association, Chemical Market Research Association, Society of Chemical Industry and The New York Academy of Sciences.

Mr Klipstein is chairman of the Chemical Engineering Advisory Council of Princeton University, and a member of the Newark College of Engineering Advisory Committee on the Junior Executive Development Conferences.

DEAN FOSTER

Dean Foster has served as director of laboratories, United States Testing Co, Inc, Hoboken, NJ, since 1952.

He holds an AB degree from the University of Indiana and a PhD from Cornell.

His affiliations include AATCC, American Psychological Association, Society of Cosmetic Chemists, AAAS, American Manufacturers Association, National Research Council, Advisory Committee to Quartermaster Corps, Institute of Food Technologists.

WALTER C GRANVILLE

Walter C Granville, assistant director, Department of Design, Container Corporation of America, went to work with his present company in 1945 to revise and supervise the production of its Color Harmony Manual, a system of color standards now used extensively in design and industry for color selection and specification. In his present position he has had opportunity to develop techniques of application for the Company's offices and factories. In addition, he superintended the recent redecoration of the Chicago Lying-In Hospital and was color consultant for the office areas of the new Appliance Park of the General Electric Company in Louisville.

Mr Granville is vice president of the Inter-Society Color Council; chairman, Chicago Chapter, Industrial Designers Institute; chairman, Sixth Annual IDI Design Award Program; fellow, Design Decorators in Industry; member, Illuminating Engineering Society (vice chairman of Committee on Color and Illumination); and member, Optical Society of America.

LEONARD B SCHLOSSER

Leonard B Schlosser is president of the Schlosser Paper Corporation, having succeeded his father, the late Fred Schlosser, to the presidency of this forty-two year old fine paper merchandising firm.

Mr Schlosser has been employed in various capacities by the Schlosser Paper Corporation for nine years, most recently as vice-president, and has had a long career of activity in the graphic arts industry, having served for two years as secretary and a director of the American Institute of Graphic Arts and currently as a member of the Board of Directors of the Paper Association of New York. He is also a member of the faculty of New York University in the Division of General Education, where he has for four years been an instructor conducting the Survey of Pulp and Paper course. Mr Schlosser is a member of the Technical Association of the Pulp and Paper Industry, and a governor of the Paper Club of New York.

Mr Schlosser is a graduate of Williams College class of 1946. He was awarded the Purple Heart and Combat Infantry Badge during World War II.

E R ALLEN

E R Allen received his undergraduate training at the University of Illinois where he received his bachelor's degree in 1906. After four years as scientific assistant in the US Department of Agriculture he entered the Cornell University graduate school where he majored in organic chemistry.

From 1923 to 1946 he was technical director for Du Pont's Pigments Department at Newark, NJ. Following this he was senior research associate at Wilmington, Del, until his retirement in 1949. Since 1950 he has held the position of research specialist, School of Chemistry, Rutgers University, where he carried on research on corrosion, on polyphosphates and on the separation of transitional elements.

He is the author of several patents and technical articles. His most recent contribution is the chapter on Organic Pigments in "The Chemistry of Synthetic Dyes," edited by H A Lubs in 1955.

FRANK P CONNOLLY

Frank P Connolly has been president of John W Masury & Son, Inc, Baltimore paint manufacturers, since 1950.

Mr Connolly is, and has been for many years, chairman of the Color Committee of the National Paint, Varnish and Lacquer Association and a member of the advertising and trade sales committees. In 1949-50 he was president of the New York Paint, Varnish and Lacquer Association, first vice president of the Sales Executive Club of New York and regional director of National Sales Executives.

Mr Connolly was awarded the paint industry's highest individual award, the George B Heckel Paint Industry Magazine Award, last year during the 67th annual convention of NPVLA.

THOMAS J CRAIG

Thomas J Craig, technical director of Sun Chemical Corporation, has been actively interested in the graphic arts ever since his days at the University of New Hampshire, where he received his BS degree in chemistry, which he later followed with a Master's degree from New York University.

With Sun Chemical Corporation since 1944, he started as assistant general manager of their Geo H Morrill division, then in 1945 was made general manager of the E J Kelly division until his present appointment. As technical director of Sun Chemical he is responsible for all corporation research and development and the management of Sun's Pigments Division.

ALFRED SIEGEL

Alfred Siegel, assistant director of the Color Research Laboratory of the Du Pont Pigments Department at Newark, N J, went with Du Pont after graduating from Pittsburgh in 1923. He has had 33 years experience in pigment research.

WILLIAM S STRUVE

William S Struve, a research supervisor in the same laboratory, joined Du Pont in 1941 from the University of Michigan. He has worked on dyes at the Jackson Laboratory of Du Pont as well as pigment research at Newark, N J.

NORMAN S CASSEL

Norman S Cassel is a vice president of Interchemical Corporation, responsible for its research and development.

He received his B S in chemical engineering from the University of Minnesota in 1922, and followed it with a degree of Chemical Engineer in 1923. His experience with textiles and his conviction that this field offered a real opportunity for chemical pioneering persuaded him, in 1937, to join Interchemical Corporation to develop for them a type of coloring material to print upon textiles. These compositions, when developed, were given the name of Aridye and the company was known as the Aridye Corporation. This subsidiary later became the Textile Colors Division of Interchemical Corporation. Mr Cassel was a vice president of the subsidiary from its inception and became president of the division in 1947. He continued in that capacity until 1952 when he was appointed to his present post.

Mr Cassel is a member of AATCC, ACS and the Commercial Chemical Development Association. He is the corporation's representative in the Industrial Research Institute. He is also a member of the Chemists' Club. In 1955 the University of Minnesota honored him with their Outstanding Achievement Award.

SIDNEY M EDELSTEIN

Sidney M Edelstein is president and technical director of Dexter Chemical Corporation. Since he was graduated from MIT in 1932, Mr Edelstein has been continuously engaged in research and development work on chemicals for the textile industry and on textile problems. He is an authority on cellulose and on mercerizing. He is the author of over forty technical publications and more than twenty patents.

Mr Edelstein is also a science historian and has assembled an outstanding collection of books and manuscripts relating to the history of dyeing and chemistry. He is secretary of the Division of History of Chemistry of the American Chemical Society and chairman of the Archives Committee of the AATCC.

EARLE R CALEY

Earle R Caley became vice chairman of the Department of Chemistry, Ohio State University in the fall of 1949.

He was graduated from Baldwin-Wallace College in 1923, entered Ohio State University and received an MS in chemistry in 1925 and a PhD in 1928.

In addition to his work on the application of chemistry to archaeology, he has conducted or supervised a number of investigations in the fields of analytical chemistry and the history of chemistry. The results of these studies and investigations are contained in about 100 publications.

He is a member of the American Chemical Society, the History of Science Society, and Sigma Xi, and a fellow of the American Association for the Advancement of Science, the Ohio Academy of Science, the International Institute for the Conservation of Museum Objects, the American Numismatic Society and the Royal Numismatic Society of London.

ERNEST R KASWELL

Ernest R Kaswell, president and associate director of Fabric Research Laboratories, Inc, holds Bachelor's and Master's Degrees from Massachusetts Institute of Technology. A former staff member of the MIT Textile Division, he spent one year as a research chemist for American Cyanamid Company prior to his becoming one of the founders of Fabric Research Laboratories, Inc in 1942.

Mr Kaswell has many publications on textile physics and chemistry including a reference book entitled "Textile Fibers, Yarns and Fabrics."

He is New England Regional Vice President of AATCC and chairman of the AATCC Committee on Wrinkle Resistance. He is a member of AAAS, ACS, AATT, and TRI.

Mr Kaswell is a member of the Governing Council of the Fiber Society, Society of the Sigma Xi, and also is a chartered textile technologist and fellow of the British Textile Institute.

HERMAN P BAUMANN

Herman P Baumann, technical director, Hawthorne Branch, American Aniline Products, Inc, was graduated from Rensselaer Polytechnic Institute in 1923 as a chemical engineer.

Mr Baumann has spent 28 years as a textile chemist with General Dyestuff Co, William Wilhelm Co, Allied Textile Printers, and United Piece Dye Works.

He is a co-translator of Diserens' "Chemical Technology of Dyeing and Printing."

LOUIS J SHEPS

Louis J Sheps, vice president, Trilon Chemicals Ltd, received his B Sc from the University of Manitoba in 1931, majoring in chemistry and geology, and his PhD from McGill University in 1934, majoring in organic chemistry.

Dr Sheps is president of The Institute of Textile Science, vice president of the Textile Technical Federation of Canada, a past president of the Quebec Section, Canadian Association of Textile Colourists and Chemists, and a fellow of the Chemical Institute of Chemistry. He also holds membership in AATCC, AAAS, Society of Dyers and Colourists, and the Textile Institute.

JOHN DEAN

John Dean has served in his present position of superintendent of the Dyeing and Finishing Departments, Canadian Celanese Ltd since 1949. He completed his technical studies at the Manchester College of Technology.

Mr Dean is member of the Council, Quebec Section, CATCC, and member of the Society of Dyers and Colourists and the Textile Institute.

LEON E MOODY

Leon E Moody, vice president, manager, and director of Duplan Dyeing Co, Ltd, received the degree of

Bachelor of Textile Chemistry from Lowell Technological Institute in 1934.

Mr Moody is president of the Quebec Section, CATCC, and also holds membership in AATCC and The Institute of Textile Science.

E I BIRNBAUM

E I Birnbaum, treasurer, The Hart Products Co of Canada Ltd, was graduated from Massachusetts Institute of Technology, class of 1930.

He is a member of AATCC, CATCC, ACS, American Association of Leather Chemists. and The Institute of Textile Science. He is a fellow of The Chemical Institute of Canada.

BRUCE F VOWLES

Bruce F Vowles first became affiliated with Canadian Celanese Ltd during World War II as a spinning chemist. He returned in 1949 as a dyehouse chemist and in 1954 was transferred to the Spinning Department to set up and supervise the production of spun-dyed cellulose acetate yarn.

Mr Vowles received his BA with honors in chemistry from Queen's University in 1940 and his MA with first class honors in colloid chemistry from the same institution in 1946.

He is a member of CATCC and The Chemical Institute of Canada.

REMUS F CAROSELLI

Remus F Caroselli is now manager of the Textile Product Development Laboratory of the Owens-Corning Fiberglas Corporation. He joined Owens-Corning Fiberglas in 1941.

Prior to his work in textiles, Mr Caroselli served three years as a cosmetic chemist. He received a BS degree in chemistry in 1937 from the University of Rhode Island.

Mr Caroselli is chairman of the Rhode Island Section of AATCC, and a member of the American Chemical Society, The Textile Institute, and Phi Kappa Phi National Honorary Society.

JOHN L CRIST

John L Crist, chairman of the board and treasurer, Southern Dyestuff Corp, has been actively engaged in the dyestuff industry continuously since 1918. He was graduated from Washington & Lee University in 1912 with a BS in chemistry.

Mr Crist's experience includes research and development in the field of sulfur dyes, design and construction of equipment and plants, and sales and sales service work with sulfur dyes.

R E RUPP

R E Rupp, director, sales service, Southern Dyestuff Corp, received his BS from Dickinson College and his PhD from Yale University.

His experience in the textile and allied industries dates back to 1925 as chemist, director of research, plant superintendent and in technical service work.

M L CROSSLEY

M L Crossley received his PhD from Brown University in 1909; ScM, 1910; PhD, 1911; Hon ScD, Brown University, 1944; Wesleyan University, 1947.

He is presently a research specialist at Rutgers University. Previously he had been associated with the Calco Chemical Div, American Cyanamid Co as research director.

HANS Z LECHER

Hans Z Lecher is an independent consulting chemist. Previously he had been director of research at the Bound Brook Laboratories of American Cyanamid Co.

Dr Lecher received his chemical education at the University of Munich, where he obtained his doctor's degree in 1913.

WILLIAM W WILLIAMS

William W Williams, technical assistant, sales manager, General Dyestuff Co, received his BS from the University of Maryland in 1936 and his PhD from the University of Illinois in 1939.

He is a member of AATCC, ACS. and AAAS.

Processes, patents, articles on dyestuffs and related chemicals; optical bleaching agents; diazo-type systems; surfactants; textile chemicals; polymers.

DAVID I RANDALL

David I Randall, technical assistant, sales manager, General Dyestuff Co, received his BS from the University of Kentucky in 1937 and his PhD from Pennsylvania State University in 1941.

He is a member of AATCC, ACS, and AAAS.

Processes, patents, articles on dyes, aromatic intermediates and petrochemicals.

MELVIN A PERKINS

Melvin A Perkins attended Middlebury College before receiving SM and PhD degrees in chemistry from Massachusetts Institute of Technology. His industrial experience with Du Pont began in October, 1926 in the field of anthraquinone vat dyes and has continued to the present in the field of dyes and organic pigments, except for the war years spent in research on fluorine chemicals (Manhattan project). His current interests are in organic intermediates, fluorescent whiteners and surface-active agents.

He is now located at Du Pont's Jackson Laboratory, Organic Chemicals Department.

MILES A DAHLEN

Miles A Dahlen, technical coordinator, Dyes and Chemical Division, E I du Pont de Nemours & Co, Inc, has been with the Du Pont organization since 1928.

He received his BS in chemical engineering in 1924 and his PhD in organic chemistry in 1928 from the University of Minnesota.

Dr Dahlen was the 1955 recipient of AATCC's Olney Medal.

In addition to his AATCC membership he is a member of ACS and AIChE.

HERMAN E SCHROEDER

Herman E Schroeder, received his AB, AM, and PhD degrees in chemistry at Harvard University. His industrial experience with Du Pont began in July 1938 in the Chemical Department in the field of general exploratory chemistry. In 1945 he moved to the Jackson Laboratory of the Organic Chemicals Department and advanced through several positions to general assistant director.

A considerable portion of his time has been spent in the dye field, first in the synthesis of new colored structures and then in the organic and physical chem-

istry involved in dyeing the newer hydrophobic fibers. Since 1951 he has been responsible for direction of the research program on dyes.

SAMUEL N BOYD, JR

Samuel N Boyd, Jr, received his BS in Chemistry from the University of Virginia in 1942 and his PhD in Organic Chemistry from the University of Illinois in 1945. Subsequently, he was employed as research chemist at Jackson Laboratory, Organic Chemicals Div, E I du Pont de Nemours & Co, Inc, where he now holds the position of assistant director. His fields of research include dyes, polymers, and general organic synthesis.

LESLIE G S BROOKER

Leslie G S Brooker was born in the village of Chalk near Gravesend, Kent, England on March 12, 1902 (thus sharing the same birthday as W H Perkin). He studied chemistry at King's College of the University of London, taking the Bachelor's degree in 1923 and the PhD in 1926.

Dr Brooker joined the Synthetic Chemistry Department of the Eastman Kodak Research Laboratories in August 1926. By 1928 he had begun to specialize in research on new photographic sensitizing dyes, and in this field he has remained. He has published many articles on the subject and, with coworkers, has been granted numerous U S patents. He was given the Modern Pioneers' Award for this work in 1940. In addition to his work on the cyanine and related dyes, Dr Brooker has published a number of papers dealing with the absorption of these dyes. He contributed chapters to Dr Mees' book "Theory of the Photographic Process" and in 1955 gave one of nine section lectures at the Zurich meeting of the 14th International Congress of Pure and Applied Chemistry. He was awarded the Henderson Medal of the Royal Photographic Society for his researches on sensitizers in 1946.

PAUL W VITTUM

Paul W Vittum is associate division head of the Color Photography Division, Kodak Research Laboratories. He received his AB from Cornell College (Iowa) in 1929 and his PhD from Cornell University in 1933. His professional interests include organic chemistry, chemistry of color photography, dyes, color and constitution, and reaction mechanisms. He is a member of Sigma Xi, Phi Beta Kappa, Photographic Society of America, Society of Motion Picture and Television Engineers, Rochester Section of American Chemical Society, since 1933, Executive Committee, 1949-50, chairman, Publicity Committee, 1949-50, secretary, 1950-52, vice-chairman, 1956, and associate of the Photographic Society of America, 1955.

ROBERT S LONG

Robert S Long obtained his BS in chemistry from St Mary's College (Minnesota) in 1936, attended the University of Minnesota Graduate School, 1936-37, and obtained his PhD in organic chemistry from the University of Illinois in 1940.

In the summer of 1940, Dr Long joined the American Cyanamid Company, Bound Brook, N J as research chemist. In 1952 he became manager of dyes research and still holds this position. His work has been largely in the field of dyes with special emphasis on azoic and azo dyes, metallized azo dyes and optical bleaching agents.

Dr Long is a member of the ACS, AAAS, AATCC, Sigma Xi, Society of Dyers & Colourists, Society of Chemical Industry and a fellow of the AIC.

HOWARD J WHITE, JR

Howard J White, Jr, was educated at Princeton University, AB 1942, PhD 1947, and University of Wisconsin, MS 1944. His major field of study was physical chemistry. While at Princeton he was a fellow of the Textile Research Institute, and, after receiving his degree, he joined the TRI staff. He is now associate director of research. His main fields of interest are the application of thermodynamics, statistical mechanics and the kinetic theory to processes involving fibers; he has been the director of the Institute's Dyeing Research Project from its inception.

MILTON HARRIS

Milton Harris received a BSc degree in chemistry from Oregon State College in 1926, took special courses in organic chemistry at the University of Washington and then entered Yale University where he received the PhD degree in 1929.

In 1931 he became a research associate for the American Association of Textile Chemists and Colorists at the National Bureau of Standards where he devoted his time to fundamental researches on the chemical and physical properties of textile fibers and fabrics. In 1939 he became director of research for the Textile Foundation and beginning in 1941 simultaneously held the position of director of research for the Textile Research Institute. At the end of 1944, he resigned both positions to organize the Harris Research Laboratories, of which he is president.

In 1956 Dr Harris was appointed director of research of the Gillette Company, in addition to continuing as president of the Harris Research Laboratories.

During the war, he acted as a member of the Advisory Board and consultant to the office of the Quartermaster General; chairman of the Committee on Textiles and Cordage of the Army-Navy-NDRC Tropical Deterioration Project; secretary, Committee on Clothing of the National Research Council; member of the Subcommittee on Wood and Plastics for the National Advisory Committee for Aeronautics; Chairman of the Wool Conservation Board; and member of the Panel on Clothing of the Research and Development Board.

Currently, he is a trustee of the Textile Research Institute and Philadelphia Textile Institute; member of the Committee on Degradation of the National Research Council; and member of Subcommittee of the Food and Agricultural Organization of the United Nations.

He has been a member of the ACS since 1931; chairman of the Cellulose Division, 1947; section editor on dyes & textile chemistry, *Chemical Abstracts;* chairman, Committee on National Meetings and Divisional Activities, ACS, 1949-51; member of the Membership Committee, 1951; member, Advisory Board on "Advances in Chemistry Series," and member of the Advisory Committee to the National Bureau of Standards. He served as chairman of the Washington Section of the American Institute of Chemists in 1953 and chairman of the Washington Section of the American Association of Textile Chemists and Colorists, 1953-54.

In 1943, he received the Award of the Washington Academy of Sciences; in 1945, the Olney Medal for research in the field of Textile Chemistry, and in 1955, the honorary degree of Doctor of Textile Science by the Philadelphia Textile Institute.

EMERY I VALKO

Emery I Valko received his PhD in chemistry at the University of Vienna. From 1929 to 1938, he was research chemist at the Central Research Laboratory of I G Farben (now Badische Anilin and Soda Fabrik) in Ludwigshafen, Germany. There he carried out a study of the mechanism of the dyeing process, which resulted in the publication of several papers and, in 1937, of a book entitled "Colloid Chemical Principles of Textile Processing."

From 1939 to 1946, he was research chemist with Onyx Oil & Chemical Company and from 1946 to 1949 director of research of E F Drew and Company. From 1949 to 1954 he was independent research consultant and project leader at the Polytechnic Institute of Brooklyn.

In 1954, Dr Valko rejoined Onyx Oil & Chemical Company as director of research, and in 1955 was elected vice president in charge of research and development.

Since 1952, Dr Valko has been serving as collaborator, Cotton Fiber Section, Southern Utilization Research Branch, Agriculture Research Service, United States Department of Agriculture.

Dr Valko is the author or co-author of more than 40 technical papers and more than 20 patents were granted to him.

He is a fellow of the Textile Institute, the Society of Dyers and Colourists, and the New York Academy of Sciences.

WILLIAM R REMINGTON

William R Remington received both SB and PhD (organic chemistry) degrees from the University of Chicago. In 1945, he was employed at Jackson Laboratory of the Organic Chemicals Department of the Du Pont Company. In 1956, he was transferred as a division head to the new Organic Chemicals Laboratory at the Du Pont Experimental Station.

While at the University of Chicago, he did war-time research on chemical warfare. With the Du Pont Company, he has worked on dye and textile-chemical synthesis and application, and synthetic rubber.

ENTERTAINMENT

Centennial registrants will want to take advantage of the infinite facilities that New York City, the nation's entertainment capital, has to offer. Your Entertainment Committee, in conjunction with the New York Convention and Visitors' Bureau, Inc, is making every effort to provide maximum service in this direction.

Free tickets to radio and TV shows will be available as well as discount-rate tickets for trips to the Empire State Building Observatory, sightseeing and boat trips, etc. Complete informational literature on restaurants, theatres, churches, amusement areas, sports emporia, etc will be offered, and Committee and Bureau personnel will be privileged to assist you in making your plans.

Theatre parties are scheduled for "The Most Happy Fella" and "No Time for Sergeants", two of Broadway's leading hits.

Complete information may be obtained in Room X, 4th Floor (Perroquet Suite).

Abstracts

(concluded from page P638)

general laws governing ionic adsorption and ion exchange, although the choice of the mathematical expression best suited for this purpose has remained controversial.

The explanation of the dyeing process is gradually transforming dyeing from an empirical art into a scientifically guided operation.

THEORY OF DYEING POLYACRYLIC AND POLYESTER FIBERS

W R REMINGTON and H E SCHROEDER
E I du Pont de Nemours and Co, Inc

These two fiber classes are similar in that both are dyed by disperse type dyes; however, polyacrylic fibers can be dyed with anionic dyes if positive sites are provided. This can be done, for example, by using a fiber containing ammonium groups. Alternatively, positive sites in the form of bound cuprous ions can be produced by treatment of the fiber with cuprous salts. In either case, ion exchange occurs in which colorless anions and dye anions compete for positive sites in the fiber.

In contrast, disperse dyes, which are used on all common fibers except cellulose and wool, require no specific dyeing sites. In polyethylene terephthalate the dyeing reaction behaves like a simple solution in the fiber, with dipole-dipole interactions probably very important.

The rate of dyeing of polyethylene terephthalate tends to be inconveniently slow, and organic compounds called carriers are used frequently to increase the rate. They are effective by increasing the diffusion rate of dye through the fiber.

RECEPTION AND INFORMATION

The Reception Committee will be located in Room M on the 4th floor.

An Information Service provided by the American Dyestuff Reporter will be located in the Grand Ballroom Check Room adjacent to the Registration Desk and will supply up-to-the-minute information on where registrants are to be found during the Centennial.

FULL PROGRAM OF COLOR MOVIES

A daily program of movies, running from 10:00 AM to 12:00 Noon and 2:00 to 4:00 PM will be shown Tuesday through Saturday. These will be shown in the Jansen Suite on Tuesday and in the Perroquet Suite for the remainder of the week.

A balanced program, including a variety of subjects of interest to those attending the Centennial celebration, will be offered free of charge.

Information brochures outlining the complete movie program for the week will be available at the Registration Desk and also in Room X, 4th Floor. Consult also the official Convention program for listings.

1956 AATCC INTERSECTIONAL CONTEST

Eight Sections will present papers in this year's AATCC Intersectional Contest, which will be held Saturday, September 15th, in the Grand Ballroom of the Waldorf-Astoria, as one of the events of the Perkin Centennial celebration.

The Rhode Island Section maintains a commanding lead in the number of cumulative points attained since the inception of the Contest. Assigning values of 5, 3 and 2 for the first, second and third places respectively (the same ratio in which prize money is awarded), the cumulative standing is as follows:

Rhode Island—45
New York—33
Philadelphia—32
Northern New England—23
Piedmont—17
Southeastern—5
Washington—5

The record of winners, since the contest was inaugurated in 1940, is as follows:

1940—1st, R I; 2nd, S E; 3rd Phil
1941—1st, N Y; 2nd, Phil; 3rd, S E
1942—1st, N Y; 2nd, N N E; 3rd, Phil
1943—1st, Phil; 2nd, N N E; 3rd, N Y
1944—1st, R I; 2nd, N N E; 3rd, N Y
1945—1st, R I; 2nd, N N E; 3rd, N Y
1946—1st, N Y; 2nd, Phil; 3rd, R I
1947—1st, N N E; 2nd, Phil; 3rd, N Y
1948—1st, Pied; 2nd, N N E; 3rd, Phil
1949—1st, R I; 2nd, N N E; 3rd, Pied
1950—1st, Pied; 2nd, R I; 3rd, Phil
1951—1st, N Y; 2nd, R I; 3rd, Phil
1952—1st, R I; 2nd, Phil; 3rd, N Y
1953—1st, R I; 2nd, N Y; 3rd, Phil
1954—1st, Wash; 2nd, Pied; 3rd, R I
1955—1st, R I; 2nd, Phil; 3rd, Pied

A glance at the above shows that the Rhode Island Section, in addition to leading in points, also leads in the number of first place awards having won 7 times. Following in order are the New York Section with 4 first places; Piedmont with 2; and Philadelphia, Northern New England, and Washington with 1 each. The Northern New England Section leads with 6 second place awards followed by Philadelphia with 5, Rhode Island with 2, and Southeastern, New York and Piedmont with 1 each. In third place awards the Philadelphia Section leads with 6, followed by New York with 5, Rhode Island and Piedmont with 2, and Southeastern with one. The details of this year's contest follow:

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Arnold, Hoffman & Co, Inc

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American Viscose Corp

JOHN M GOULD
Barre Wool Combing Co, Ltd

KENNETH A HOWRY
Daily News Record

THOMAS R SMITH
Wiscassett Mills Co

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U S Dept of Agriculture

Mid-West

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American Aniline Products, Inc

SAMUEL M LITTLEJOHN, *alternate*
Munsingwear, Inc

New York

JACK M SCHANDLER, *judge*
Rohm & Haas Co

ALBERT R EANZEL, *alternate*
E I du Pont de Nemours & Co, Inc

Pacific Southwest

ARCH J MEASE, *judge*
E I du Pont de Nemours & Co, Inc

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American Aniline Products, Inc

Philadelphia

F J DE MARIA, *judge*
Para-Chem Inc

RICHARD B STEHLE, *alternate*
Allegheny Dye Works

Piedmont

BERNARD G ZIMMERMAN, *judge*
Zimmerman Associates

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Rhode Island

EDWARD LAWRENCE, *judge*
Cranston Print Works Co

KENNETH L DORMAN, *alternate*
Franklin Process Co

South Central

J C WHITT, *judge*
Standard-Coosa-Thatcher Co

WILLIAM F LUTHER, *alternate*
Lumar Corp

Washington

ROBERT STEVENSON, *judge*
U S Dept of Agriculture

LOUIS MIZELL, *alternate*
Harris Research Labs Inc

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ROBERT ROBINSON, *judge*
Bachman-Uxbridge Worsted Co

Western New England

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Princeton Knitting Mills

Hudson-Mohawk

JOHN HANLON, *judge*
Mohasco Industries, Inc

EDWARD J COGOVAN, *alternate*
Mohasco Industries, Inc

Southeastern

HOWARD McCAMY, *judge*
Seydel-Wooley & Co

S JACK DAVIS, *judge*
The Chemstrand Corp

Niagara Frontier

JEAN G KERN, *judge*
Allied Chemical & Dye Corp

BERNE L WOOLEY, *alternate*
Allied Chemical & Dye Corp.

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American Institute of Laundering

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Morgan Dye & Bleach Co

DAVID A ANDERSON
Phoenix Trimming Co

EDWIN I STEARNS
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Bear Brand Hosiery Co

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Ciba Co, Inc

HARRY W ERICSON
American Aniline Products Inc

JOSEPH H JONES
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Consultant

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RUSSELL G LAWRENCE
Rohm & Haas Co

HOWARD PINNER

LINTON REYNOLDS

R HOBART SOUTHER
Cone Mills Corp

Rhode Island

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Allied Chemical & Dye Corp

WILLIAM H CADY

ERNEST J CHORNYEI
Bradford Dyeing Assoc

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Franklin Process Co

DAVID C HARDMAN

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Arnold Hoffman & Co, Inc

ALDEN D NUTE
American Cyanamid Co

HARRIS V PETELLE
Interchemical Corp

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Florence Dye Works, Inc

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Verona Dyestuffs

HELMUTH VITS
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Products Development Laboratory

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E I du Pont de Nemours & Co, Inc

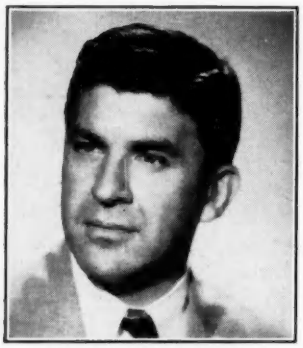
GERSON HERMANN
Eastern Color & Chemical Co

DAVID R MEIKLE
Stillwater Worsted Mills Inc

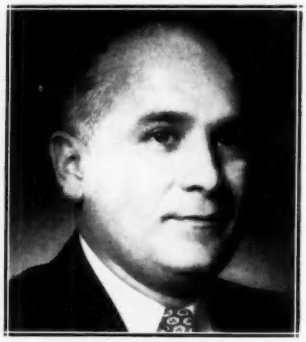
INTERSECTIONAL CONTEST PRINCIPALS

ROBERT STEVENSON
(U S Dept of Agriculture)
Chief Justice & Judge, Washington

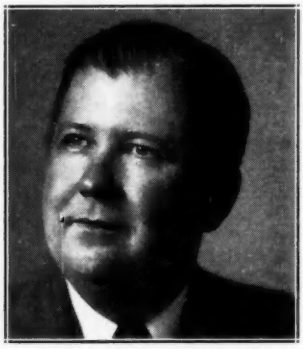
FRANK STOVER
(American Aniline Products, Inc)
Judge, Mid-West



JACK M SCHANDLER
(Rohm & Haas Co)
Judge, New York



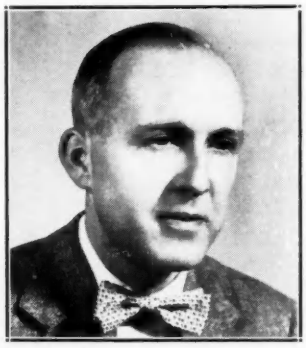
F J DE MARIA
(Para-Chem Inc)
Judge, Philadelphia



BERNARD G ZIMMERMAN
(Zimmerman Associates)
Judge, Piedmont

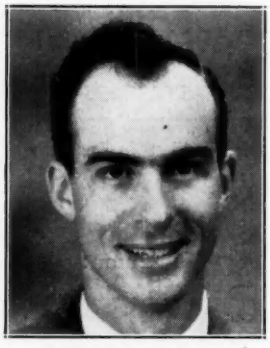
EDWARD LAWRENCE
(Cranston Print Works Co)
Judge, Rhode Island

J C WHITT
(Standard-Coosa-Thatcher Co)
Judge, South Central



ROBERT ROBINSON
(Bachman-Uxbridge Worsted Co)
Judge, Northern New England

ALLEN O MOGENSON
(American Cyanamid Co)
Judge, Western New England



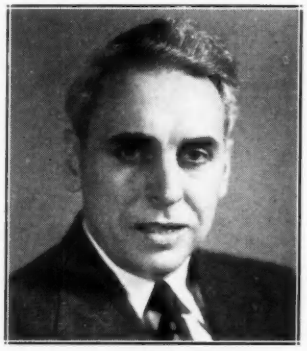
HOWARD McCAMY
(Seydel-Wooley & Co)
Judge, Southeastern

JEAN G KERN
(National Aniline Div)
Judge, Hudson-Mohawk

JACKSON A WOODRUFF
(American Viscose Corp)
Secretary, National Intersectional Contest Committee

JOHN M GOULD
(Barre Wool Combing Co, Ltd)
Member, National Intersectional Contest Committee

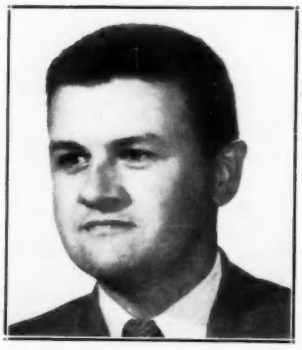
KENNETH A HOWRY
(Daily News Record)
Member, National Intersectional Contest Committee



LEE G JOHNSTON
(American Inst of Laundering)
Chairman, Mid-West

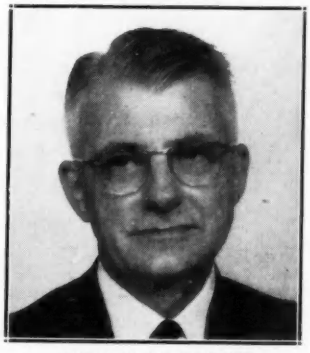
EDGAR W LINEKEN
(American Cyanamid Co)
Chairman-speaker, New York

RITA LANDRY
(UCLA)
Speaker, Pacific Southwest



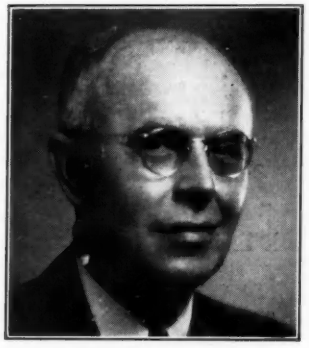
WILLIAM S SOLLENBERGER
(American Viscose Corp)
Chairman-speaker, Philadelphia

LUTHER B ARNOLD
(Elon College)
Chairman-speaker, Piedmont



ARTHUR W GROVER
(Enterprise Dye Works)
Cochairman, Rhode Island

W J MOHR
(Southern Latex Corp)
Speaker, South Central



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Chairman, South Central

NELSON F GETCHELL
(National Cotton Council)
Chairman-speaker, Washington

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Univ of Rhode Island

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FRANCIS L TOHER
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ALLISON WEBB

GLEN R BELLAMY
Ciba Co, Inc

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James Lees & Sons Co

DEWEY T THOMPSON
Callaway Mills Co

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IRES AKERS

PAUL J SMITH
Walker County Dye Works

FRANK H COOPER, JR
A & M Karagheusian, Inc

WILBUR K NEWMAN
Peerless Woolen Mills

JAMES L FESPERMAN
Cabin Crafts, Inc

WILLIAM D BLACKMAR, JR
Sandoz Chemical Works, Inc

A T HANES

ARTHUR R WILLIAMS, JR
E I du Pont de Nemours & Co, Inc

A C ANDERSON

FLETCHER L KIBBLER
Morningside Chemical Co

ANDREW J KELLY
Burkart-Schier Chemical Co

WILLIAM J MOHR
Southern Latex Corp

Washington

NELSON F GETCHELL, *chairman and speaker*
National Cotton Council of America

FLORENCE H FORZIATI
National Bureau of Standards

GEORGE P FULTON
National Institute of Drycleaning

LAWRENCE L HEFFNER
W E Hooper & Sons Co

WILLIAM M SEGALL
National Cotton Council of America

ROBERT T GRAHAM
National Institute of Drycleaning

JAMES H KETTERING
U S Naval Research Laboratory

ABSTRACTS OF INTERSECTIONAL CONTEST PAPERS

THE INFLUENCE OF FABRIC ADDITIVES ON DRY SOIL ACCUMULATIONS AND REMOVAL

MID-WEST SECTION

This paper covers a study of the effect of various fabric additives on soil resistance and the removal of soil.

Knitted fabrics of approximately equal weight and construction but of various fibers were treated with additives of different ionic characteristics for comparison purposes. Treated and untreated fabrics were artificially soiled with a dry soil mixture.

The degree of soiling was measured by reflectance. The comparative ease of removal of the soil from fabrics having different treatments was measured by comparing the reflectance readings before and after a washing treatment. Data are presented to show the effects of the various additives on the soiling characteristics of the fibers involved.

EFFECT OF RESIN FINISHES ON LIGHT FASTNESS OF VAT DYES

PIEDMONT SECTION

The extensive use of thermosetting resins on cotton fabrics in recent years has made it important to know more about the extent and, if possible, the reason for the change in fading of some vat dyes after resin treatment. At this point the effect of resin treatment on the fading properties of direct colors after treatment with thermosetting resins is well known. This was studied by the Rhode Island Section of the AATCC and reported in 1953. In the work at hand the effect of resin treatment on the fading properties of thirty vat dyes in light and heavy shades on cotton has been studied. Only thirteen of the dyes were unaffected. Two of the dyes showed less fading after resin treatment than without. Of the remaining colors most showed only slightly increased fading, but several showed marked increase in fading after resin treatment. The effect was the same whether a cyclic ethylene urea resin or a methylated melamine resin was used.

The study has been extended to include the effect of change in catalyst, omission of washing after curing, variation in curing temperature, and the addition of various types of softeners and stiffeners, such as are commonly used in commercial resin finishes.

The relationship between Fade-Ometer and sunlight fading has been studied briefly.

An attempt has also been made to correlate the fading phenomena with structure of the dye.

THE EFFECT UPON SHADE MATCHING FROM THE USE OF DIFFERENT LATEX FORMULATIONS WITH SELECTED DYESTUFF CLASSIFICATIONS

SOUTH CENTRAL SECTION

Tufted rayon carpet has been processed using twelve selected dyes, several of which contained copper, to-

gether with counterparts which were copper free. Four latex formulations were used—three compounded from natural latex and one compounded from GR-S. Latex was applied before and after dyeing.

Tests conducted were:

(1) Light Exposure (Fade-Ometer)
(2) AATCC Wash Test #2
(3) Oxygen Bomb Aging
(4) Air Oven Aging

Shade variations, together with significant latex deterioration, are evident.

THE APPLICATION OF ELECTRICAL INSTRUMENTS FOR MEASURING MOISTURE CONTENTS OF TEXTILES

NEW YORK SECTION

It is generally established that the instrumental measurement and control of moisture is an important factor in the textile industry. This was substantiated by citations from general practice together with direct testimonials from important mills. The instruments employed for measuring moisture are described in detail together with comparative results of oven drying techniques. A considerable number of variables with respect to the fibers themselves such as dyestuffs involved, scouring, etc, were covered in order to determine their influence with respect to a given instrument.

It is not the purpose of this paper to recommend or refute the use of any given instrument for the measurement of moisture but merely to present conclusions and limitations as derived from our own experimental work.

A rather extensive bibliography has been included in order to permit those interested in the subject to familiarize themselves with most of the work which has been done in the field.

It is the Committee's conclusion that instrumental methods of moisture determination constitute a definite contribution to the textile industry and, when properly employed, such methods can be a real service to the processor of textiles.

REPORT ON THE EFFECT OF SMOG ON TEXTILE MATERIAL IN LOS ANGELES

PACIFIC SOUTHWEST SECTION

This paper presents introductory data on the effect of smog in the Los Angeles area on a variety of dyed textile materials. Physical, chemical and geographical factors involving smog conditions are described.

The testing program consisted of exposure under smog conditions of dyed woven and knitted fabrics, and rubberized and elastic fabrics, as outlined below:

a) Acetate rayon—disperse dyestuffs
b) Viscose rayon—directs and vat dyestuffs
c) Nylon—acid, metalized and disperse dyestuffs
d) Wool—acid, metalized and specialty dyestuffs
e) Orlon—basic and disperse dyestuffs
f) Cotton—direct, vat and sulfur dyestuffs

The above prepared test fabrics were exposed and tests made before and after exposure. Testing comprised gas fading, tensile strength, pick count and outdoor aging. Equipment, such as a gas chamber, Scott tester, exposure box (outdoor type) and an artificial smog chamber, was available.

Literature and references are supplied from such sources as Stanford Research Institute Bulletins and the Air Pollution Foundation.

AN INVESTIGATION OF ROLLER PRINTING ON WOOL

RHODE ISLAND SECTION

The primary objective of this study was to find the most practical method of roller printing on wool with conventional equipment without basic alteration.

The secondary objective was to produce a fabric of sufficient color fastness and dimensional stability to withstand laundering. All trials were made on dress-weight material. Various chlorinations, bleaches and pH factors were investigated for the best color yield. Certain pretreatments to prevent fibre damage and aftertreatments to increase fastness were examined. Several classes of dyestuffs were tested.

CATIONIC SOFTENERS—THEIR SECONDARY EFFECTS ON TEXTILE FABRICS

PHILADELPHIA SECTION

The final finishing of textile fabrics, whether chemical or mechanical in nature, is of major importance in their manufacture and acceptability. Cationic softeners frequently play an important role in the various chemical finishing treatments which are applied to fabrics.

A considerable amount of data has been published and many claims made on the usefulness of cation active materials as germicides, water repellents, direct dye fixatives and softeners. However, relatively little, if any, data is available on the effect of cationic softeners on secondary fabric properties.

For this study nine cationic softeners were chosen after thorough investigation to insure that they represented the various known and commercially available types of quaternaries, amine, amide and imidazoline derivatives. A relatively new nonionic type has been included for comparison and to obtain further basic information.

Both pad and substantive application at two concentrations were considered, but the former method was adopted for the bulk of the work. The softeners were applied by accepted procedures to Acrilan, Arnel, cotton, nylon, rayon, and wool fabrics under mill conditions. An attempt was made to determine relative differences between softener types on such fabric properties as tear strength, seam efficiency, electrical resistivity, aging, heat, and color change resulting from the latter two and ultra-violet light.

Results of these tests as related to the various individual fabrics are discussed and data presented in tables and graphs.

A STUDY OF THE SCORCHING CHARACTERISTICS OF FABRICS

WASHINGTON SECTION

A technique for scorching fabrics by contact with a heated metal surface and measuring the color change produced has been developed. Fabrics were found to scorch more rapidly in contact with heated metal than in air, but both methods were shown to rank fabrics in the same general order. A series of experiments in which undyed fabrics made from a number of different fibers were heated at various temperatures and periods of time show the method to be a convenient means of studying and comparing the scorching characteristics of textile materials and finishing treatments. Results indicate that scorching is more dependent on the chemical nature of the fiber or finishing treatment than on the physical form of the fiber on fabric.

PRESIDENT'S ADDRESS

RAYMOND W JACOBY

President, AATCC

It has been customary for the President's Address (essentially a report to the association members) to be delivered at the Annual Convention Banquet. This year the Annual Convention is not a separate entity, but is a part of the Perkin Centennial which will be attended by members of a considerable number of professional societies. As the President's Address is of interest primarily to AATCC members, it has been deemed advisable to publish it in the Perkin Centennial Issue of the *American Dyestuff Reporter* rather than present it at the Banquet.

Before detailing the various activities and accomplishments I should like to take a few moments to discuss our Association. It was founded 35 years ago. Measured against the passing of time, 35 years is insignificant. Measured against the total progress and developments to date, those of the past 35 years are tremendous. When we started, our fibers were few—mostly those of nature. Appreciable commercial production of man-made fibers was non-existent. The various types of dyes in general use were comparatively few in number. Wet-processing equipment was quite simple and of limited varieties. Today there is great diversity in all these items.

When we were founded we adopted the name, the American Association of Textile Chemists and Colorists. At that time that name was a correct description of the activities and training of those persons interested in the formation of such an association. Today it is doubtful whether a group of people who are merely textile chemists and colorists would function effectively. Textile technology has become closely intertwined with textile chemistry.

In order for you to realize the great change which has come over the wet-processing industry I would suggest that you look over the Index by Subjects and Index by Authors in the year-end issue of the *American Dyestuff Reporter*. It will be very enlightening. You will see a list of the papers we have heard and a list of authors whom we know. It will be apparent that we have become a much broader association than one of textile chemists and colorists. You will find that our Association also comprises the following:

A) Physicists who deal with such subjects as stress-strain curves, amorphous or crystalline structures of fibers, pH, static, micelles, optics, redox potential, surface tension and viscosity.

B) Organic chemists whose chemistry goes far afield from our early chemistry into monomers, polymers, polymerization, cross linking, chelation, catalysis, thermoplastic and thermosetting resins, and carriers.

C) Engineers dealing with numerous types of equipment, such as the Williams Unit, Barotor, Pad-Steam Unit, Sanforizer, compactor, high-speed ager, curing equipment, high-pressure contact dryer, and high-pressure jig.

D) Textile technologists who realize that several factors normally in their domain of the production of yarns and fabrics can have a great effect upon the finished results as do the selection of dyes and method of application.

E) Mathematicians who soar into higher realms, and statisticians who plan and evaluate experiments.

The Philadelphia Section has done an outstanding job in conducting courses at the Philadelphia Textile Institute. Early this year, at the request of their members, they presented a course in Thermodynamics. It is doubtful whether many of our original members who took courses in Chemistry rather than Chemical Engineering were even remotely familiar with Thermodynamics.

Today we are a much broader organization than one of textile chemists and colorists. A considerable number of our charter members are still active. They, together with subsequent members, have not only kept pace with these developments but have contributed much to them. They were a very vital factor in this transition and are not only willing but eager to pass on their knowledge and experience to those who follow. This is what has made our Association great.

PERKIN CENTENNIAL———The current year is a momentous one in the history of AATCC. As 1956 marks the 100th Anniversary of Perkin's discovery of Mauve, the first synthetic dye, and as we are an organization one of whose principal interests is the application of colorants, it was logical that we should recognize this important date by sponsoring a Perkin Centennial. Scores of members of the participating societies have cooperated in perfecting plans which will materialize soon. We sincerely hope and trust that the Perkin Centennial will do credit to the occasion which it honors and to the industries which have arisen therefrom.

PRESIDENT'S ADVISORY COMMITTEE———As the problems which confronted the association increased in numbers and scope, it became apparent that they required broad consideration. In order to accomplish this, the President's Advisory Committee became very active and functioned wisely and well in giving generously of their time, knowledge and experience.

ORGANIZATION———The major subject which received long and serious consideration by the President's Advisory Committee was that of Organization. It had become increasingly evident that there should be more continuity than existed with volunteer workers whose services terminated in accordance with the Bylaws. This situation was emphasized by the resignation of Harold C Chapin as Secretary after many years of faithful service. It was with deep regret and profound appreciation of his work that the Council accepted his resignation. The new office of executive secretary-assistant treasurer was created. George P Paine, currently assistant secretary of the American Standards Association, will assume the duties of this office on September 1, 1956. Albert E Sampson, for many years the hard-working and conscientious treasurer of AATCC, submitted his resignation to take effect at the discretion of the Council. With industry's great demands upon its personnel, in many instances they cannot devote the necessary time to volunteer service, and we are confident that under the new organization plan we will operate very satisfactorily.

VICE PRESIDENTS———The amendment to the Bylaws creating the four regional vice presidents was made to provide a contact between the Sections and the National body. A further amendment was made detailing the functions of these officers. The reports

of the vice presidents at the various Council Meetings show that more direct contacts are maintained and it is believed that the plan is working to the advantage of all segments of the association.

ECR AND TCR———In accordance with the Bylaws, Leonard Little relinquished the office of chairman of ECR. He had taken an active part in ECR since it was established. His report gave a very complete outline of the history of this committee. The Council expressed its most sincere thanks and appreciation for his able and generous service through the years. Charles W Dorn assumed the office of chairman of ECR and was succeeded as chairman of TCR by Charles A Sylvester. This will provide continuity of experienced leadership of these important committees. By working in close contact with Harold W Stiegler, director of research, the Research Department will provide proper service to our members and to industry.

CORPORATE MEMBERSHIP———For the Research Department to function, it must have the necessary funds. These are supplied by the Corporate Members. Under the able and energetic chairmanship of Albert E Johnson, the Corporate Membership Committee has carried on a very successful campaign to increase the number of Corporate Members, and the amount of Corporate Member dues. As a result of these accomplishments, funds are available to carry out the expanded Research Program during the coming fiscal year.

INTER-SOCIETY RELATIONS COMMITTEE——— Many of our members are members of and take an active part in the affairs of other Societies. Of this we are very proud. In addition to these services as individuals, we have members who are the official delegates of AATCC on committees of other associations. In this capacity they are the official representatives of our association and it is judged accordingly. This situation, therefore, is one in which all of our members are vitally concerned. There are many features such as authority, responsibility, method of appointment, length of service, reporting to our membership, etc, which require close supervision. The Inter-society Relations Committee under the chairmanship of Carl Z Draves has been given authority to supervise all of these functions and is meeting this responsibility carefully and thoroughly.

ARCHIVES COMMITTEE———Too often when we want to delve into the past to obtain guidance for the future, we have to rely upon the memories of individuals. In the thirty-five years of its existence, there has been much in the activities of the AATCC which will be a valuable reference in the future. Other older institutions have considerably more. There is much about the wet-processing industry on which information should be preserved for the future. To provide for this, an Archives Committee under the Chairmanship of Sidney M Edelstein was created. He has been very active and with his zealous interest and enthusiasm, has already assembled much valuable information and material which otherwise might have been lost or destroyed. Lowell Technological Institute is providing a room for the safe-keeping of these valuable sources of information. The National Records Management Council is greatly interested in this program and appreciates the great precedent value in having one of the leading professional associations take such constructive steps to assure proper preservation of those things which will be of extreme interest and value in the future. Robert A Shiff, president of the National Records Management Council, addressed the AATCC Council at their meeting of June 15, 1956, commended this work and offered the assistance of his organization.

EDUCATIONAL COMMITTEE———We are constantly reminded of the fact that our educational institutions turn out fewer technically trained men than the industry requires. This is true of most fields, and is particularly so in the textile industry with which we are closely associated. This fact is frequently discussed and admitted and sporadic efforts are made from time to time to arouse the interest of prospective students in careers in textiles. It was believed that if these various individual efforts on the part of industrial firms, schools and associations could be consolidated into joint action it might be very effective. This would call for the expenditure of a considerable sum of money and such an undertaking, of necessity, would have to be self-supporting. The suggestion was made that AATCC assume leadership in such a project. An Educational Committee under the Chairmanship of Henry A Rutherford was appointed to study the entire subject and make recommendations. Their initial investigation found a widespread interest in and realization of the necessity of such an effort. It also revealed the many complications which existed. Much more study will be required before any definite plan can be worked out and adopted. It will be worth the effort if a comprehensive plan can be developed and adopted.

SUBJECT AND SPEAKER'S BUREAU COMMITTEE———Under the chairmanship of Matthew J Babey, this Committee is providing the service which was expected of it. It assists Sectional Program Chairmen in finding subjects and speakers, and similar information is made available to other associations. It further enables those with valuable information to impart to find a receptive audience. As their accumulated records increase, and as the service which they can render becomes more widely known and appreciated, it will be another means whereby the AATCC can attain the objects for which it was established.

PUBLICATIONS COMMITTEE——— The Publications Committee continues to give consideration to providing our members with valuable and constructive literature. As a professional association we must maintain a high scientific and professional standard for papers. They cannot be a medium for commercial exploitation. Instructions regarding papers submitted for publication have been drawn up and publicized. Questionable papers will be submitted to a board of editors. This subject is of mutual interest to Howes Publishing Company, Inc and the AATCC, and with joint membership in this committee, we are confident our members will be well served by their publications.

PUBLICITY COMMITTEE——— There are two requisites for successful publicity:

1.) to have something worthwhile to publicize
2.) to have people who know how to do it.

The expanded activities of AATCC provides the former. The Publicity Committee under the chairmanship of James A Doyle provides the latter. The frequent references to AATCC in the nation's press is evidence of the very efficient work of this committee for which we are extremely grateful.

SECTIONAL ADVISORY RESEARCH COMMITTEE ———A vital subject which has lain dormant for several years has been revitalized by this committee

under the chairmanship of Eugene W K Schwarz. Their recent report, after a lengthy study, offered many constructive suggestions. This has been thoroughly reviewed by ECR, and undoubtedly we will embark upon a program which will contribute materially to the progress of our association.

COLOUR INDEX——Ten years of cooperative effort by The Society of Dyers and Colourists and the American Association of Textile Chemists and Colourists will culminate in the publication of the new *Colour Index* in the near future. It will be in three volumes, of which Volume I will be available for distribution in the latter part of 1956. This will be followed by Volume II and III in the early part of 1957. The supporters of this project have been most patient. It was inevitable that in such an extensive undertaking there would be innumerable delays, but it is doubtful if anyone expected there would be so many. The accumulation of the data which will appear in the *Colour Index* was a task of over ten years' duration. The American manufacturers of coloring materials had members of their staff assigned to this work for the entire period. Not only our association, but all of those concerned with the application of colorants, owe them a great debt of gratitude. It is sincerely hoped that as these new volumes come into general use, all who contributed so generously to their preparation will consider that it was time and money well spent.

CONCLUSION———On this occasion I would like to express to the entire membership of the Association my most sincere appreciation of their kindness and consideration during my two terms as president of AATCC. While it was a great honor, it was also a great responsibility which I have endeavored to meet to the limits of my ability.

I am one of those who served in this field for several years before there was an AATCC. I know, first hand, what it was like in those days, and, therefore, I am most appreciative of what the AATCC has done for those so engaged.

How quickly we forget. How quickly we take things for granted. Since this association was founded, a whole new generation was born, grew to maturity, and entered into its activities. It is impossible for them to realize what it was without an AATCC, what it was like before the objects for which this association was founded were attained.

To me, personally, the AATCC has been a help and inspiration. I will always owe a debt of gratitude to the Association, and endeavor whenever and however it is possible, to make some payment of that debt.

REPORT OF THE NOMINATING COMMITTEE

THE Councilors representing Sections, in their capacity as Nominating Committee, have nominated George O Linberg and Walter M Scott as candidates for president in the year 1957. The nomination of any other Senior member, signed by fifty or more Senior members, may be filed with the secretary not later than October 1st, and will be given equal standing on the ballot.

The members of the Northern New England, Rhode Island and Western New England Sections will elect a vice president for the New England Region. The Councilors from this Region have nominated Ernest R Kaswell.

The members of the Hudson-Mohawk, Niagara Frontier, New York and Philadelphia Sections will elect a vice president for the Central Atlantic Region. The Councilors from this Region have nominated Weldon G Helmus and Frederick V Traut.

The members of the Piedmont, Southeastern, South Central and Washington Sections will elect a vice president for the Southern Region. The Councilors from this Region have nominated C Russell Gill and H Gillespie Smith.

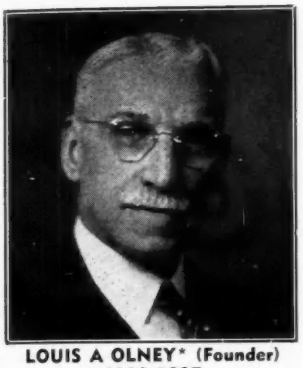
The members of the Mid-West, Pacific Southwest and Pacific Northwest Sections will elect a vice president for the Western Region. The Councilors from this Region have nominated Elliott Morrill.

A nomination for vice president from any Region, signed by twenty-five or more members of that Region, may be filed with the secretary not later than October 1st, and on the ballot will receive equal standing with other nominations for that office.

HAROLD C CHAPIN
for the Nominating Committee

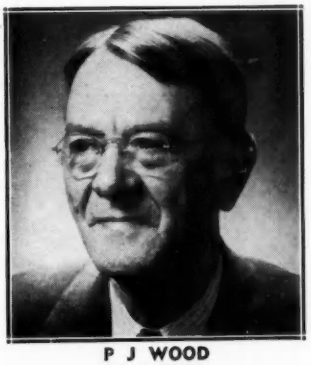
PAST PRESIDENTS OF AATCC

(An asterisk follows the names of the deceased)

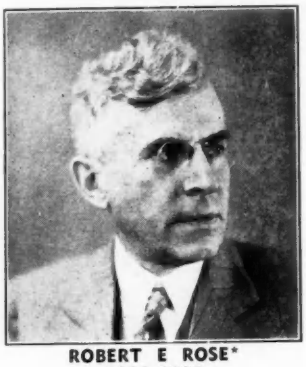


LOUIS A OLNEY* (Founder)
1922-1927

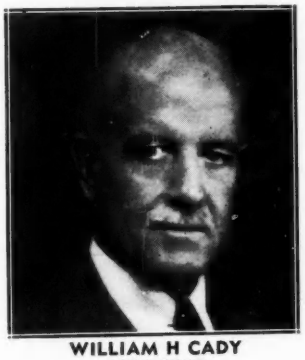
ELVIN H KILLHEFFER
1928-1930



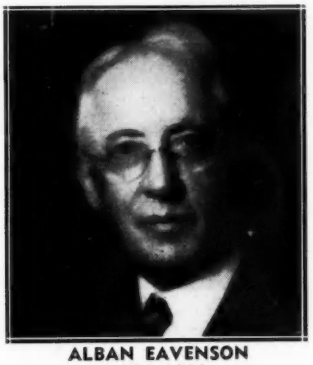
P J WOOD
1931-1932



ROBERT E ROSE*
1933-1935



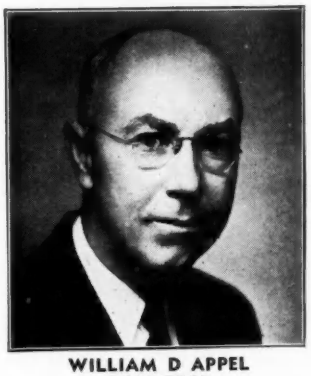
WILLIAM H CADY
1936-1937



ALBAN EAVENSON
1938-1939

CARL Z DRAVES
1940-1941

THOMAS R SMITH
1942-1943



WILLIAM D APPEL
1944-1946

HENRY F HERRMANN
1947-1949

C NORRIS RABOLD
1950-1952

J ROBERT BONNAR
1953-1954

NATIONAL OFFICERS OF AATCC

President ..... RAYMOND W JACOBY, Ciba Co, Inc, 627 Greenwich St, New York 14, N Y
Vice President (Central Atlantic Region) . . FREDERICK V TRAUT, Globe Dye Works Co, 4500 Worth St, Philadelphia 24, Pa
Vice President (Western Region) . . JOSEPH H JONES, Phoenix Dye Works, 1963 Southport Ave, Chicago 14, Ill
Vice President (New England Region) .... ERNEST R KASWELL, Fabric Research Laboratories, Inc, 1000 Providence Highway, Dedham, Mass
Vice President (Southern Region) . . WALTER M SCOTT, U S Dept of Agriculture. Washington 25, D C
Executive Secretary and Assistant Treasurer ..... GEORGE P PAINE, Lowell Technological Institute, Lowell, Mass
Assistant Secretary ..... RICHARD R FREY, Lowell Technological Institute, Lowell, Mass
Treasurer ..... ALBERT E SAMPSON, National Aniline Division, Allied Chemical & Dye Corp, 150 Causeway St, Boston 14, Mass
Treasurer Emeritus ..... WILLIAM R MOORHOUSE, P O Box 352, South Yarmouth, Mass
Founder ..... LOUIS A OLNEY (Deceased)
Chairman of the Executive Committee on Research . . CHARLES W DORN, Consultant, Suite 1300, 369 Lexington Ave, New York 17, N Y
Director of Research. HAROLD W STIEGLER, Lowell Technological Institute, Lowell, Mass

GEORGE P PAINE
(AATCC)
Executive Secretary & Assistant Treasurer

RICHARD R FREY
(AATCC)
Assistant Secretary

ALBERT E SAMPSON
(National Aniline Div)
Treasurer

WILLIAM E MOORHOUSE
Treasurer Emeritus

CHARLES W DORN
(Consultant)
Chairman, Executive Committee on Research

HAROLD W STIEGLER
(AATCC)
Director of Research

CHAIRMEN—COMMITTEES OF THE COUNCIL

Appropriations	A E SAMPSON
Archives	S M EDELSTEIN
Bibliography	W H CADY
Colour Index Editing	W H CADY
Colour Indexing Marketing	A E SAMPSON
Constitution and Bylaws	H C CHAPIN
Conventions	G O LINBERG
Corporate Membership	A E JOHNSON
Inter-Society Relations	C Z DRAVES
Intersectional Contest	E D McLEOD
Membership and Local Sections	J H JONES
Perkin Centennial	R W JACOBY
President's Advisory	J R BONNAR
Publications	W M SCOTT
Publicity	J A DOYLE
QM-Air Force Dye Survey	W A HOLST
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Technical Committee on Research	C A SYLVESTER
Technical Program	W M SCOTT
Technical Supplies	H C CHAPIN
Textile Education	H A RUTHERFORD

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Chairman, Archives

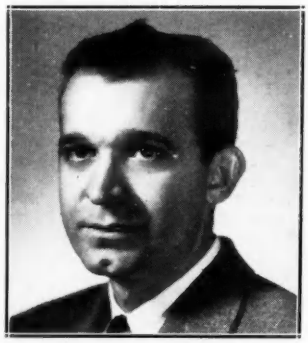
ALBERT E JOHNSON
(Nat'l Institute of Drycleaning)
Chairman, Corporate Membership

EARLE D McLEOD
(Arnold, Hoffman & Co, Inc)
Chairman, Intersectional Contest

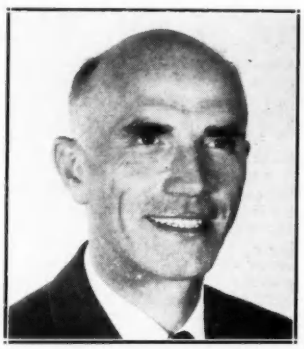
JAMES A DOYLE
(Howes Publishing Co, Inc)
Chairman, Publicity

WILLIAM A HOLST
(National Aniline Div)
Chairman, QM-Air Force Dye Survey

EUGENE W K SCHWARZ
(Consultant)
Chairman, Sectional Research Advisory



MATTHEW J BABEY
(American Cyanamid Co)
Chairman, Speakers' Bureau



CHARLES A SYLVESTER
(E I du Pont de Nemours & Co, Inc)
Chairman, Technical Committee on Research

HENRY A RUTHERFORD
(North Carolina State College)
Chairman, Textile Education

THIRTY-FIVE YEAR HISTORY OF THE AATCC

NORMAN A JOHNSON

Editor, American Dyestuff Reporter

THE Perkin Centennial also marks the near completion of thirty-five years of achievement on the part of the AATCC and its members. To commemorate this approaching anniversary we present this brief history of the Association, which reviews the events leading up to its formation and its subsequent growth and influence.

EARLY ORIGINS

To the present over 7,000 members of AATCC it will seem unbelievable that there was no nationally organized association of textile chemists prior to 1921, although there had been some attempts at formation in different localities and among different groups. There was a dyers' association in Philadelphia around 1900 and there were several other local bodies but none of these made any pretense at being national in scope or scientific in purpose.

An alumni group of the Philadelphia Textile School held several meetings in New York during 1910 and 1911 at which the organization of a technical society was discussed. There was much optimism at one such meeting in 1910 but no action was taken. That the idea was engaging the attention of several groups at the same time is illustrated by the following quotation from a letter by Dr Louis A Olney to Dr Frederick Dannerth under date of April 27, 1911:

"It has been proposed several times that a section be formed in this country of the British Society of Dyers and Colourists. On general principles, I am opposed to this, because I believe there are enough prominent men connected with the industry in this country to make such a society a success without attaching themselves as a tag end to a foreign society. I therefore believe, that if any move is made along this line, it should either be as an independent American Society, or in conjunction with the American Chemical Society.

"In case anything should be done in regard to this matter, it would be necessary, I should say, to formulate a circular letter to be sent to the leading textile and paper chemists of the country for their views in regard to the matter, for there would be nothing gained by starting such a movement unless the cooperation of such men was guaranteed beforehand."

Quite active discussions took place from this time on and there seemed to be a definite movement afoot to actually start an association when the first World War temporarily intervened. However, during the period of the war, there was another conference in New York called by Drs Olney and Dannerth at which the formation of an association was again discussed. There was also a meeting somewhat later at the Lowell Textile School at which a small group gave unanimous approval to the idea but still no move was made toward organization.

The first editorial appeal for the organization of an association appeared in the Monthly Technical supplement of the AMERICAN DYESTUFF REPORTER for September, 1920. An

AMERICAN DYESTUFF REPORTER

Standard Dye Tests and Standard Records—A Plea

By LOUIS A. OLNEY

Professor of Chemistry and Dyeing, Lowell Textile School
President, Stirling Mills, Lowell, Mass

IN a statement so condensed that even the busy man can and will take time to read it, I wish to make a plea for greater efforts toward the standardization of methods of dye testing and uniform methods for recording such tests.

Every user of dyes is interested in the fastness of his colors toward one or more of the following color destroying agencies: Light, washing, scouring, bleaching, acids, alkalies, fulling, carbonization, perspiration, etc.

As yet no official methods of making or recording such tests have been accepted by any duly authorized body, and much confusion and no little misunderstanding is constantly arising between various interests particularly the textile manufacturer and the dyestuff maker and dealer.

In many instances the large textile manufacturing interests have worked out rather elaborate systems for their individual requirements. Some of the foreign dyestuff concerns have also done more or less along this line, but their work has always been from the point of view of the dyestuff manufacturer or dealer and not particularly in the interests of the consumer. No organized effort has thus far been made with the object of adopting a standard working agreement or system, mutually acceptable to the various interests.

As a result, one textile manufacturer attempting to communicate with another or with a dyestuff dealer in regard to the fastness of a certain dye is often at a loss to know by the statements made just what degree of fastness the other intends to convey and whether they are all in agreement with each other. The economic losses arising through such misunderstandings and which might be eliminated, partly at least, through official standards cannot of course be measured, but must run into very many thousands of dollars each year.

The difficulties and the expense which would be encountered in the perfection of such standard methods have in a way delayed their introduction, but the chief cause of postponement has been the lack of realization that such a series of tests could be devised and adopted.

In the writer's opinion the establishment of such a set of officially recognized standard methods of dye testing is possible, but before any headway can be made toward this end three essential requirements are absolutely necessary.

1. Development of sufficient interest on the part of both manufacturers and consumers of dyes, but particularly the latter

2. Accurate research and experimental work extending over a considerable period of time.

3. Sufficient funds to carry on such work.

Sufficient interest will develop as soon as the extensive users of dyes throughout the country realize the value of such a series of officially recognized tests. As soon as such an interest develops the funds will be forthcoming, as has been the case with co-operative movements on the part of other industries. As soon as the funds are forthcoming the proper workers may be secured and the work pushed along to a successful termination.

Development of sufficient interest is therefore fundamental and the main object of this appeal is to develop such an interest. It is hoped that at an early date expressions of opinion from some of the leading textile manufacturing and dyestuff associations may be published.

It is recognized, of course, that some dyestuff dealers and manufacturers who sell practically the same articles in competition with each other under different names and in varying strengths might object to standard tests which would at once classify their products, but the good of the majority ought to prevail.

Expressions of opinion from representatives of textile manufacturing concerns and various color interests will be welcomed by the editors of the AMERICAN DYESTUFF REPORTER.

HERE is a suggestion to dyestuff consuming and manufacturing interests which is well worth careful consideration. The importance of the general subject of standard tests for fastness has long been recognized, but for one reason or another no concerted movement in this direction has been inaugurated. Publicity and a general discussion of the subject are prerequisites to any constructive action and, as Professor Olney suggests, The Reporter will be glad to co-operate in any such movement to the extent of its ability.

Reproduction of page in Monthly Technical Supplement of American Dyestuff Reporter of September, 1920. This is perhaps the first editorial appeal for the promotion of an association such as the AATCC.

editorial entitled "Standard Dye Tests and Standard Records—A Plea" by Dr Olney was published in this issue. While this did not call for the establishment of an association it did emphasize the need for standard methods for testing dyes and the fact that the industry should have some method for handling them. Following this in June, 1921 an editorial by A P Howes also appeared in the Supplement entitled, "Wanted: A Technical Association of the American Textile Industry," quotations from which follow:

"The benefits to be derived from a technical association of the textile industry are obvious. It would make possible the freer interchange of ideas and could provide for the dissemination of knowledge useful to all. It might reasonably be expected to develop better acquaintanceship and morale among technical men, to stimulate the spirit of research, and to emphasize right educational methods in the industry—all of which are results worth going after. . . . Very important likewise, it could greatly facilitate the establishment of standards, particularly standard methods of dye testing. The need for the latter has been repeatedly emphasized by the REPORTER and our remarks on this subject have received endorsement from many leaders in dyestuff and textile circles. It is a need universally recognized throughout the industry, and the sole reason why it remains unfilled today is because of the lack of machinery for concerted action. Standard methods for textile testing and analysis should also be legitimate fields of endeavor for such an organization. . . .

"The REPORTER believes that the time is ripe for the organization of a technical association of the textile industry, and that the industry would gain immeasurably by the presence of such a body within its ranks. We shall be glad to hear the views of any readers on this important subject, to give publicity to any suggestions which would be of interest along this line, and shall account it an honor if we can be of service in aiding those desirous of bringing about the creation of such a body."

Dr Olney mailed reprints of this editorial to persons of prominence in the textile chemical field and asked them for comments on the organization of a "technical society for advancing the scientific interests of the textile industry." Excerpts from their replies were published in the July and August Monthly Technical Supplements. The support was practically unanimous in favor of such an association and from then on the project was never laid aside.

A letter of invitation to be present at a meeting at the Engineers Club in Boston on August 26th was sent out by Dr Olney to a small group of outstanding persons in the textile chemical field. The express purpose of this meeting was to take the necessary steps for the formation of an association of textile chemists and colorists. After considerable discussion, it was decided to invite a much larger group to attend a meeting at the Chemists' Club in New York on September 13th for further consideration of the proposed association. An enthusiastic group of persons gathered at this meeting, which was called to order by Winthrop C Durfee. Louis A Olney was elected chairman and Walter E Hadley, secretary. The following motion, offered by Walter M Scott, carried:

"That the chairman of this meeting be authorized to appoint a general committee of five or more and such subcommittees as may be deemed necessary for the purpose of presenting a working plan for an American Association of Textile Chemists and Colorists at an inaugural meeting to be held in Boston during the week of the Textile Exposition."

INAUGURAL MEETING

The inaugural meeting was held on November 3rd, 1921 at the Engineers

AMERICAN
DYESTUFF REPORTER

In Two Sections—Section Two

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
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WANTED: A TECHNICAL ASSOCIATION OF THE AMERICAN TEXTILE INDUSTRY

"HE travels fastest who travels alone" is not an adage enjoying good standing among those responsible for our modern industrial development. To-day it has become the merest truism to say that in organization there is strength, efficiency, economy and increased production. Industrial co-operation is no longer merely an advantage; economic conditions have made it an actual necessity.

This need is one which has not been escaped by the textile industry of this country, and a survey of its various parts makes it fairly plain that the particular department through which such co-operation could enter and find application to the best advantage is by way of its technologists. Time was when empirical skill alone constituted the basis of achievement in the industry; now it has come about that mill owners the country over recognize the value of a technical textile education. The trained mill man is increasing in numbers and importance, and his work is so far becoming the moving force of the industry that the textile technologists of to-day are the executives of to-morrow. But the full possibilities of their usefulness have not yet been generally realized, in part, at least, because they have lacked an organization of their own which would enable them to co-operate in a really effective manner.

The benefits to be derived from a technical association of the textile industry are obvious. It would make possible the freer interchange of ideas and could provide for the dissemination of knowledge useful to all. It might reasonably be expected to develop better acquaintanceship and morale among technical men, to stimulate the spirit of research, and to emphasize right educational methods in the industry—all of which are results worth going after. By degrees it could accumulate and preserve, in the form of a library, a great mass of information much needed by textile men, and it could even assist in the preparation of a series of text-books of great worth. Very important, likewise, it could greatly facilitate the establishment of standards, particularly standard methods of dye testing. The need for the latter has been repeatedly emphasized by The REPORTER and our remarks on this subject have received endorsement from many leaders in dyestuff and textile circles. It is a need universally recognized throughout the industry, and the sole reason why it remains unfilled to-day is because of the lack of machinery for concerted action. Standard methods for textile testing and analysis should also be legitimate fields of endeavor for such an organization.

As to details, the suggestion is offered—and it is a suggestion only—that membership might well consist of active members, junior members and corporate members. The age requirement for active members might be placed at twenty-eight years or over. They should possess a technical education or its equivalent and should have been actively engaged in the manufacture of textiles or in industries or institutions related thereto for at least five years, and in responsible positions for at least three years. Fulfillment of the duties of a professor of applied science to the textile industry who is in charge of a department in a college or school of accepted standing, might be taken as the equivalent of an equal number of years of active practice. Junior members might be admitted at the age of twenty-one years or over, and should have had such training as would enable them to fill subordinate positions in the industry; or they should be graduates of technical schools of recognized standing.

Corporate members might consist of individuals, firms or corporations actively engaged in the manufacture of textiles, or in the manufacture or sale of chemicals or other materials used in the textile industry. Such a class of members would be desirable by reason of the fact that the nominal dues paid by active and junior members would scarcely avail to defray the cost of such research work as it would be to the best intercsts of all to have the association undertake. It has been demonstrated in other industries that the cost of research work of a really serious and ambitious character is surprisingly low to such corporate members. Each corporate member, of course, should name an individual to vote for it at meetings.

Meetings might be held two or three times a year, and during these meetings technical and engineering problems could be discussed. The organization could also accomplish much through the appointment of standing committees delegated to take specific problems under consideration.

For a concrete example of the efficacy of such an industrial body, one has only to turn to the Technical Association of the Pulp and Paper Industry, which is organized along lines very similar to those outlined above and which is unquestionably accomplishing a most important work in getting its members ready to become leaders in the paper industry of the future.

Reproduction of an editorial in the American Dyestuff Reporter of June 6, 1921, calling for the formation of a technical association.

Club in Boston, with Dr Olney presiding. It was pointed out that the notices of the meeting had been in the form of invitations to become charter members. About two hundred and twenty-five had already returned blanks indicating their desire to become charter members and one hundred and forty were present at the meeting. It was voted that all who had sent in the signed applications would be organized as charter members into the American Association of Textile Chemists and Colorists. A constitution and bylaws were adopted at this meeting and the following officers elected:

President—Louis A Olney
Vice-Presidents—William D Livermore and William H Cady
Secretary—Walter E Hadley
Treasurer—Winthrop C Durfee
Councilors—James L Amsden, Walter M Scott, William K Robbins, George A Moran, Elmer C Bertolet and Arthur E Hirst.

STEADY GROWTH

The second annual meeting of the Association was held under the sponsorship of the New York Section on December 2nd, 1922, at the Hotel Pennsylvania; thus the New York Section became the first local section to sponsor a general meeting. At this meeting all executive officers were reelected and it is interesting to note that there was no such thing as a nominating committee. Nominations were made by ballot from the entire membership.

Also at this meeting an amendment was voted to the Constitution reading as follows:

"Any corporation which is interested in the work of the Association may at the discretion of the Council be admitted to a corporate membership which shall entitle it to all the privileges of active membership with the exception of voting."

Subsequently the Howes Publishing Company was admitted as the first corporate member and A P Howes was designated as its representative.

The steady growth in the number of corporate members and their increasing contributions to the research fund is a tribute to the esteem in which the Association is held by our company members.

At the end of the first year there were four active chapters of the Association and a total membership of 400. The Research Committee was actively functioning through a number of hard-working subcommittees. In October, William H Cady, chairman of the subcommittee on Fastness to Light, had published the first summary for our Association, of progress by various investigators in efforts to standardize methods for determining fastness to light of dyes. The treasurer's report for the first year is also of interest when compared with our present-day reports:

Received from dues $1,885.00
Expenses;
Organization $162.40

AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to
DYESTUFFS, COLORS and ALLIED CHEMICALS
"Circulated Everywhere Dyestuffs Are Used"

Vol. 9 New York, September 19, 1921 No. 12

TEXTILE CHEMISTS AND COLORISTS VOTE TO ORGANIZE

Preliminary Meeting in New York Attended by Sixty—Decide to Appoint Committees to Present Organization Plan at Boston Textile Show—Dr. Shreve, A. C. S. Dye Section Secretary, Views Project with Favor—Declares Interests Will Not Conflict

ON the evening of Friday, August 26, a group of prominent textile chemists gathered for dinner at the Engineers' Club in Boston for the purpose of discussing the desirability of taking steps looking to the formation of some sort of an association of textile chemists and colorists. It was the opinion of those present that steps of this sort should be taken and they decided upon the issuance of the following invitation, which was mailed to over a hundred representative textile chemists in the Eastern part of the country:

"You are invited to attend a meeting to be held Tuesday, September 13, at 2 P. M., at the Chemists' Club, 52 East Forty-first Street, New York City, for the purpose of considering the formation of an

ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

and in case the sentiment of such a meeting is favorable, of taking preliminary steps toward its organization."

The above invitation was signed by—

William D. Livermore,
Chief Chemist, American Woolen Company,
Lawrence, Mass.
Winthrop C. Durfee,
Consulting and Manufacturing Chemist,
Boston, Mass.
George A. Moran,
Chief Chemist, Pacific Mills,
Lawrence, Mass.
Walter M. Scott,
Chief Chemist, Cheney Brothers,
South Manchester, Conn.
Walter S. Williams,
Chemical Engineer, Mt. Hope Finishing Company,
North Dighton, Mass.
William R. Moorehouse,
National Aniline & Chemical Co.,
Boston, Mass.

Reproduction of page in American Dyestuff Reporter reporting the organization meeting in New York

AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to
DYESTUFFS, COLORS and ALLIED CHEMICALS
In Two Sections—Section One
"Circulated Everywhere Dyestuffs Are Used"

Vol. 9 New York, November 7, 1921 No. 19

TEXTILE CHEMISTS AND COLORISTS ORGANIZE NATIONAL ASSOCIATION AT BOSTON

Meeting at Engineers' Club Attended by 140—Two Classes of Membership Provided for—Constitution Formally Adopted—Officers and Councillors Chosen for First Year

IN accordance with the resolution taken in New York during the week of the Chemical Show, the inaugural meeting of the American Association of Textile Chemists and Colorists was held at the Engineers Club, Boston, on Thursday, November 3. About 300 invitations to become charter members of this new body had previously been sent out by the Organization Committee to a representative list of textile chemists and dyers identified with the textile manufacturing industry, and also to color application experts associated with the various dyestuff manufacturers. More than 200 acceptances had been received by the committee up to the time of the meeting, and out of these who had thus signified their determination to attend, 140 were present in person.

The meeting was called to order at three o'clock by Chairman Louis A. Olney, of the Organization Committee, who briefly set forth the purpose of the meeting as being the creation of a definite organization of serious-minded men for scientific purposes along the lines provided for by the vote taken at the preliminary meeting held in New York, at the Chemists' Club, on Tuesday, September 13.

Thereupon, with but little loss of time, the meeting proceeded to organize itself by unanimous vote as the American Association of Textile Chemists and Colorists.

William D. Livermore, chairman of the Committee on By-Laws, then read the text of the proposed Constitution as drafted by the committee during the past few weeks; and this instrument was then discussed section by section, subjected to several alterations, and adopted. In its final form the Constitution provides that membership shall consist of two classes, namely, Active and Junior Members.

Active Members must be at least twenty-six years of age and must be actively engaged either as textile

Report of the inaugural meeting in Boston as reproduced from the American Dyestuff Reporter. Shortly thereafter the Proceedings began to appear in the Monthly Technical Supplement.

Administration	549.97	
Sections	125.00	
Journal	545.00	
		1,382.37
Interest and Exchange		12.09
Balance on hand		$ 514.72

On February 17, 1923 the Council appointed a committee consisting of Ralph F Culver, *Chairman*, P J Wood and W C Durfee to choose a suitable emblem for the Association. The committee eventually designed the emblem which is still in use today.

At the third annual meeting held in Providence on December 8, 1923, it was reported that there were then about 600 members, residing in 23 different states and several foreign countries. It was also reported that there were 5 corporate members and the treasurer noted that the Association had a balance of $1,124.52. It was voted to have independent junior sections.

At the seventh annual meeting held in New York on December 2nd and 3rd, 1927, Dr Louis A Olney retired as the first president of the Association and Dr Killheffer became the second. Dr Olney reported that, at the end of six years, the Association had grown to a membership of 1,000 with six flourishing sections. He continued:

"I am convinced that its constant growth, as well as its accomplishments, has demonstrated without any doubt the desirability and value of such an organization; and furthermore, I am inclined to believe that an association of the character of ours will be of even greater value during the years to come. . . . The most important work before the Research Committee is the continuation of the study of standard methods of dye testing."

Dr. Killheffer said that the ultimate value of the work of the Research Committee could not be possibly known at that time, inasmuch as what they had done up to the present had been more or less in the way of laying a foundation for a substantial permanent structure.

ASSOCIATION INCORPORATED

On October 26, 1928, the matter of incorporating the Association was discussed at a Council meeting and a committee appointed to investigate the matter. Following a favorable report, a meeting for the organization of the Corporation of the American Association of Textile Chemists and Colorists was held at the Lowell Textile Institute on February 6th, 1929, and it was voted that the constitution of the AATCC as printed in the *Year Book* be adopted as the constitution of the incorporated association. All present officers of the Association were elected officers of the corporation. The necessary documents were filed at the Massachusetts State House on March 5th.

FORMATION OF THE SECTIONS

RHODE ISLAND———At the very first Council meeting on November 18, 1921, a petition was received for the formation of a local section in Providence and William H Cady was appointed secretary *pro tem* to proceed with the organization of such a section. The inaugural meeting of the Rhode Island Section was held on December 30, 1921, at the To Kalon Club in Pawtucket and at a meeting held the following February 17th, Mr Cady became first chairman.

NORTHERN NEW ENGLAND ——— A petition requesting the formation of a Boston Section was presented to the Council on December 9, 1921, and Winthrop C Durfee was appointed secretary *pro tem* to proceed with the organization. The inaugural meeting of the Northern New England Section was held on March 4, 1922, at the Engineers' Club in Boston and Hugh Christison became its first chairman.

NEW YORK———The third section to petition for formation was the New York Section, which applied at a Council meeting on January 13, 1922, and Elvin H Killheffer was named

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

President
LOUIS A. OLNEY
Lowell Textile School, Lowell, Mass.

Vice-Presidents
WILLIAM D. LIVERMORE WILLIAM H. CADY

Secretary
WALTER E. HADLEY
5 Mountain Avenue, Maplewood, N. J.

Treasurer
WINTHROP C. DURFEE
316 Atlantic Avenue, Boston, Mass

Councilors
JAMES L. AMSDEN GEORGE A. MORAN
ELMER C. BERTOLET WILLIAM K. ROBBINS
ARTHUR E. HIRST WALTER M. SCOTT

PROCEEDINGS OF THE INAUGURAL MEETING

Held at the Engineers' Club, Boston, Mass., November 3, 1921

THE meeting was called to order at 3 p. m. by Louis A. Olney, Chairman of the Organization Committee. After brief remarks, in which he expressed the gratification of the committee over the enthusiastic response with which all of their endeavors had been met, and commenting upon the fact that probably at no previous time had so many American textile chemists and colorists gathered together upon a seriously-minded purpose, he proceeded to outline the business of the meeting.

In explaining the purpose of the meeting the Chairman said:

"We have come together this afternoon to continue and complete the work of organizing the American Association of Textile Chemists and Colorists. Preliminary steps were taken in New York early in September, and those of you who were present will remember that at that time the Chairman was authorized to appoint a committee of five or more and such subcommittees as might be deemed necessary to make further preparations and present definite plans for completing the organization at a meeting to be held during the week of the Textile Exposition in Boston.

"Such committees were duly appointed and have been diligently engaged, and you have been called together at this time to consider the definite plans which they are ready to present."

The personnel of the committees appointed by the Chairman was as follows:

GENERAL ORGANIZATION COMMITTEE

PROF. LOUIS A. OLNEY, Chairman;
Lowell Textile School,
Lowell, Mass.

WALTER E. HADLEY, Secretary;
Chief Chemist, Clark Thread Co.,
Newark, N. J.

WILLIAM D. LIVERMORE,
Chief Chemist, American Woolen Co.,
Lawrence, Mass.

GEORGE A. MORAN,
Chief Chemist, Pacific Mills,
Lawrence, Mass.

WALTER M. SCOTT,
Chief Chemist, Cheney Bros.,
South Manchester, Conn.

WILLIAM R. MOORHOUSE,
National Aniline & Chemical Co.,
Boston, Mass.

ROBERT E. ROSE,
Director of Application Laboratory, E. I. du Pont de Nemours & Co.,
Wilmington, Del.

WILLIAM H. CADY,
Chief Chemist, U. S. Finishing Co.,
Providence, R. I.

FREDERIC DANNERTH,
Textile Trade Laboratory,
Newark, N. J.

A. E. HIRST,
Chief Chemist and Assistant Superintendent,
American Printing Co.,
Fall River, Mass.

SPECIAL COMMITTEES

Committee on Inaugural Meeting, Program and Nominations

WINTHROP C. DURFEE, Chairman;
Consulting and Manufacturing Chemist,
Boston, Mass.

WILLIAM R. MOORHOUSE.

RUSSELL W. HOOK,
Textile Chemist, A. D. Little & Co., Inc.,
Cambridge, Mass.

WALTER S. WILLIAMS,
Chemical Engineer, Mount Hope Finishing Co.,
North Dighton, Mass.

Reproduction of the first page of Proceedings of the Association ever published.

secretary *pro tem*. The inaugural meeting was held on February 3rd at the Chemists' Club in New York and P J Wood was elected first chairman at a subsequent meeting on April 21st at the Hotel Pennsylvania.

PHILADELPHIA —— Philadelphia petitioned the Council at its June 9, 1922 meeting and Elmer C Bertolet was appointed secretary *pro tem*. The organization meeting was held on November 10th at the Philadelphia Textile School and Dr Robert E Rose was elected first chairman.

PIEDMONT —— The Southern Section was authorized by the Council on September 26, 1924, and Elvin H Killheffer was appointed secretary *pro tem* to proceed with its organization. The inaugural meeting was held at the Hotel Imperial, Greenville, SC, on October 23rd and Brown Mahon was elected first chairman. The name of this section was changed to the Piedmont Section by the Council on November 5, 1926.

SOUTH CENTRAL———Members of the Piedmont Section, residing west of the Appalachians, organized the South Central Section at a meeting held in the Patton Hotel, Chattanooga, on April 30, 1927. P F O'Neil became first chairman of this section.

MID-WEST —— Dr Killheffer was empowered to represent the Council at a meeting of members in the middle west area in Chicago on March 16, 1929, to receive and approve a petition from those members to form a local section. The petition was accepted and Carl E Bick was designated to proceed with the organization. Mr Bick was subsequently elected first chairman.

SOUTHEASTERN———The inaugural meeting of the Southeastern Section was held on June 20, 1931 at the Hotel Ralston, Columbus, Ga and E A Feimster, Jr. was elected its first chairman. The formation of this section was approved at a Council meeting on October 16th.

WESTERN NEW ENGLAND——— At the Council meeting on January 9, 1948 the formation of a Western New England Section was authorized and Dr J Edward Lynn was appointed secretary *pro tem* to proceed with its organization. Dr Lynn was elected first chairman of this section at a meeting on April 2, 1948.

PACIFIC SOUTHWEST SECTION ———The formation of a Pacific Coast Section was authorized by the Council on October 23, 1947. H A Desmarais was appointed secretary *pro tem* to proceed with its organization and at the organization meeting on April 28, 1948 Frank P. Brennan was elected first chairman. On January 13, 1950 the Council approved the change of name to the Pacific Southwest Section.

HUDSON-MOHAWK —— Application for the formation of a Hudson-Mohawk Section, which had held an organization meeting a week earlier, was presented to the Council on September 24, 1948. Organization was approved by the Council and Dr Jack Epelberg was appointed secretary *pro tem* and subsequently elected first chairman.

PACIFIC NORTHWEST —— At the Council meeting on September 9, 1949 a petition for organization of a Pacific Northwest Section was approved and R M True was named secretary *pro tem*. The first meeting was held on November 1, 1949 and Earl B Brearly was elected first chairman.

WASHINGTON———At its meeting on November 6, 1952 the Council approved a petition for the formation of a Washington Section and Walter M Scott was appointed secretary *pro tem* to proceed with its organization The first meeting was held on January 9, 1953 and Milton Harris was elected first chairman.

Proceedings of the American Association of Textile Chemists and Colorists

COUNCIL MEETING

THE first meeting of the Council of the American Association of Textile Chemists and Colorists was held Friday, November 18, at the Engineers' Club, Boston, Mass.

The following were present: Prof. Louis A. Olney, President; Wm. D. Livermore and Wm. H. Cady, Vice-Presidents; W. E. Hadley, Secretary; W. C. Durfee, Treasurer, and Geo. A. Moran, Walter M. Scott, A. E. Hirst and Wm K. Robbins, Councilors. Letters were read from Prof. F. C. Bertolet and J. L. Amsden, who were unable to be present.

Among the important matters considered were:

The formation of the various committees authorized by the Constitution, and the nature of the work to be undertaken by each

The formation of local Sections in general, and of a Providence Section in particular.

Discussion as to general character and form of membership application blanks.

Discussion as to status of junior members and junior branches.

The matter of the publication of the proceedings of the Association.

Committees

It was voted that the Research Committee should consist of the present Council of eleven members, with four additional members, and such further additions in the future as might be deemed advisable.

The four additional members chosen were: Wm. R. Moorhouse. Dr. R. E. Rose, Ed. F. L. Lotte, Dr. W. J. Murray.

The above Committee is to have supervision over all of the research work done by the Association, delegating and distributing the same to various members of the Association best fitted for such work, and to other agencies when thought desirable.

The personnel of the Research Committee is such as to include all branches of textile chemistry and textile coloring as related to the cotton, wool and silk industries, also the technical side of the dyestuff industry and general research work.

It was also voted that for the time being the work of standardization could be under the supervision of the Research Committee.

It was decided to hold the first meeting of the Research Committee directly following the next meeting of the Council, on Friday, December 9.

The formation of the Finance Committee was deferred until a later date, the Treasurer to handle all money matters at present.

It was voted to combine the Library and Publication Committees as one and retain the original Publication Committee consisting of E. H. Killheffer, as Chairman, and W. E. Hadley and F. C. Holden as the other members.

It was voted that the Committee on Meetings should consist of the President, the two Vice-Presidents, the Secretary and the Treasurer.

It was voted that the Committee on Membership and Local Sections should consist of the six elected Councilors and the Secretary, and that their first meeting should be held on the same date as the next Council meeting, when a chairman could be elected.

All of the above committees are to serve for one year.

The form of membership application blanks was discussed and final details left in the hands of the President and Secretary. These blanks are now ready for distribution.

While it was thought desirable by some of the members of the Council that dues for junior members should be somewhat reduced, over those of active members, it was decided that according to the Constitution this could not be changed until the expiration of one year.

It was voted that L. A. Olney, President of the Association, be appointed to officially represent the American Association of Textile Chemists and Colorists in any work of co-operation with the Color Laboratory of the Bureau of Chemistry, Department of Agriculture, Washington, D. C., of which Dr. Jos. A. Ambler is Director.

Letters were read from Councilors Prof. F. C. Bertolet and J. L. Amsden, the latter suggesting that work be instituted as soon as possible on the standardization of the fastness of colors.

Wm. H. Cady presented a petition signed by twenty-six members of the Association requesting approval for the formation of a local Section in Providence, R. I. It was voted to authorize such Section, and Wm. H. Cady was appointed Secretary *pro tem*. The geographical boundaries of the section were designated as the State of Rhode Island.

It was decided that the formation of a local Junior Section to incorporate the present Alembic Society of the Lowell Textile School could be authorized by a local Section of the Association when formed.

The matter of publication of the proceedings of the Association was discussed.

It was decided that all articles referring to research and standardization must undergo the closest scrutiny of the Research Committee before publication.

The matter of incorporation of the Association was discussed and left for the President to secure further information and report at the next meeting of the Council.

NOTICE OF MEETINGS

The next meeting of the Council will be held Friday, December 9, at the Engineers' Club, Boston, Mass., at 3 P. M. A meeting of the Research Committee will be held at the same place at 4 P. M. of the same day. Members wishing to bring any matters to the attention of the Council are requested to communicate with either the President or Secretary prior to that time.

Reproduction of a page in the Proceedings which reports the first Council meeting.

NIAGARA FRONTIER———A petition to organize a Western New York Section was presented to the Council on April 30, 1954 and Dr J Edward Lynn was appointed secretary *pro tem* to proceed. The inaugural meeting was held June 4 1954 at the Westbrook Hotel, Buffalo, New York and Jean G Kern was elected first chairman. The Council later approved a change in name to Niagara Frontier.

STUDENT CHAPTERS

LOWELL TECHNOLOGICAL INSTITUTE ——— The first student chapter was formed, originally as an affiliate of the Northern New England Section, at the Lowell Textile School. The first meeting was held March 22, 1923 and Everett V Steele was elected first chairman.

NORTH CAROLINA STATE COLLEGE———At the Council meeting on May 1, 1930 an application was received for the formation of a student section. R M Mitchell, chairman of the Piedmont Section, was appointed to call an organization meeting which was held at the college on June 6th and R A Gilliam was elected first chairman.

PHILADELPHIA TEXTILE INSTITUTE———The formation of a third student section, at Philadelphia Textile School, was authorized by the Council on December 4, 1936. The first meeting was held on December 11th and John L Waldo was elected its first chairman at a subsequent meeting on December 16th.

NEW BEDFORD INSTITUTE OF TEXTILES AND TECHNOLOGY ———The formation of a New Bedford Textile School Student Chapter was authorized at a Council meeting on April 18, 1942 and the first chairman was Eugene J Mognilnicki.

GEORGIA INSTITUTE OF TECHNOLOGY———The organization of a student chapter at the Georgia School of Technology was approved at the Council meeting of December 12, 1946.

CLEMSON COLLEGE———At the Council meeting on October 23, 1947 the formation of a student chapter at Clemson College was authorized. At a meeting on March 1, 1948, A M Hand was elected first chairman.

BRADFORD DURFEE TECHNICAL INSTITUTE ——— The first meeting of the Bradford Durfee Technical Institute Student Chapter was held on April 12, 1948 and Paul N Dargie was elected chairman.

UTICA TECHNICAL INSTITUTE ———At the Council meeting on June 9, 1949 approval of a student chapter at the New York State Institute of Applied Arts and Sciences was voted and Robert Zarnoch was subsequently elected first chairman.

FAIRLEIGH DICKINSON COLLEGE———A student chapter at Fairleigh Dickinson College was authorized by the Council on April 20, 1951 and Rudolph Simone was elected first chairman at a meeting on May 18th.

RHODE ISLAND SCHOOL OF DESIGN———A petition for formation of a student chapter at the Rhode Island School of Design was approved by the Council on January 16, 1953. Albert J Strumar was elected first chairman.

ALABAMA POLYTECHNIC INSTITUTE———On April 20, 1956 the Council approved the application for a student chapter at Alabama Polytechnical Institute. C Lamar Hall, Jr was elected first chairman.

PUBLICATIONS

PROCEEDINGS———At the inaugural meeting on November 3, 1921 Elvin H Killheffer, chairman of the Committee on Publications, described the desirability of having an association Journal to carry technical papers and other matters of interest to mem-

Every Buyer of Dyestuffs Should Own and Use

The 1924 Year Book

of the

American Association of Textile Chemists and Colorists

This volume contains carefully prepared tables of all American-made dyestuffs, grouped both alphabetically and by Schultz numbers. If you know the name of a color you can ascertain its maker and its classification. Under its proper Schultz number you will also find listed all similar competing products. It is a handy and reliable DYESTUFF BUYERS' GUIDE.

This Year Book also contains the Standard Methods of Determining the Fastness of Dyestuffs on Dyed Silk and Wool and Dyed and Printed Cotton. The tests are given for determining the fastness of dyes to laundry and mill washing, fulling, scouring and other agencies for each of these fibers. The methods of making the fastness tests on each kind of fiber for each class of fastness are described fully. The dyes and the washing and fulling formulas used in each test are given.

The book also includes the detailed reports of the Sub-Committees on Fastness to Perspiration and Fastness to Light and of the Research Committee—each of which contains technical material valuable to anyone concerned with the testing and application of dyestuffs.

Copies of this volume may be obtained at $3 per copy from the Secretary of the Association, Walter E. Hadley, 5 Mountain Ave., Maplewood, N. J.

Reproduction of an advertisement for the 1924 Year Book.

bers, at the same time pointing out the financial impossibility of such a venture in the early years of an association. He reported that A P Howes, publisher of the AMERICAN DYESTUFF REPORTER, had offered to place at the disposal of the Association the space required to publish its proceedings. This offer was, for a short period, without any cost to the Association. Dr Killheffer reported that his committee had immediately accepted this generous offer and, in addition, had worked out with Mr Howes the terms of compensation for a semi-permanent use of the REPORTER as the journal of the Association. Describing the terms of the proposal as very favorable and pointing out that it would give the Association a journal immediately, he moved for its acceptance and the motion unanimously carried.

At the Council meeting on September 26, 1930 it was voted that a suitable contract be executed which would continue into the future the satisfactory arrangement with the Howes Publishing Company which had prevailed. A contract was accordingly signed at the Council meeting on October 31st. With minor revisions, the contract was extended in 1947 for a period of 50 years, with provision for a three-year cancellation period.

TECHNICAL MANUAL AND YEAR BOOK———On December 16, 1922 the Council voted that the Howes Publishing Company be authorized to publish a *Year Book* under the direction of the Council and this proved to be such a success that the following year it was agreed to proceed with one for 1924. It is interesting to note that the 1924 *Year Book* contained tables of dyestuffs listed alphabetically and by Schultz numbers, standard methods of determining the fastness of dyestuffs on dyed silk and wool and dyed and printed cottons (laundry and mill washing, scouring and other agencies), and reports of the subcommittees on fastness to perspiration, fastness to light, and of the Research Committee. It was indicated that the 1925 *Year Book* would list the dyes according to their *Colour Index* numbers as well as Schultz numbers wherever possible. The volume has increased in size and scope each year and is a recognized standard reference work.

COLOUR INDEX———A most ambitious undertaking was inaugurated on October 5, 1945 when the Council voted to cooperate with the British Society of Dyers and Colourists in a revision of the *Colour Index*. William H Cady was appointed coordinator for the AATCC and has been engaged in this work ever since. During June of 1948 J Robert Bonnar and William D Appel participated with representatives of the Society of Dyers and Colourists in discussion on the *Colour Index* at Buxton, England which resulted in a very satisfactory agreement. At the Council meeting on September 9, 1949, the Treasurer was authorized to borrow from general and research funds to finance publication of the new *Colour Index* contingent upon the Council's approval of a contract with the Society. On October 13, 1949 progress toward a contract with the Society was reported and the mailing of a first set of questionnaires on acid colors to manufacturers had been sent out. On September 28, 1950 the officers were authorized to sign a contract with the Society as soon as the final details had the approval of the steering committee. In June of 1951 further conferences with representatives of the Society were held in Brighton and Manchester, England with C Norris Rabold and Leonard S Little representing the AATCC. On November 16, 1951 Albert E Sampson reported agreement with the Society on the type of paper to be purchased in this country for the *Colour Index* and the

beneficial to the yarn than the cheaper oil or any kind of oil would be, because there are lots of oils, and you do not know which kind you are using, and the oil would be more apt to make your goods crock than the alcohol.

Mr. Chase—If there is no further discussion on Naphthol, I think we had better call it a day.

. . . Upon motion the meeting adjourned at 11 p. m.

FIFTY-SEVENTH COUNCIL MEETING

THE Fifty-seventh Council Meeting of the Association was held at the Chemists' Club, New York, 12:15 o'clock Friday afternoon, March 8.

The following officers and councilors were present: President E. H. Killheffer; Vice-Presidents W. S. Williams and P. J. Wood; Councilors Ralph F. Culver, William R. Moorhouse, Hugh Christison and Walter M. Scott; Councilors ex-officio William H. Cady, Chairman Northern New England Section; Richard B. Earle, Chairman Rhode Island Section; Daniel P. Knowland, Chairman New York Section; A. M. Burt, Chairman Philadelphia Section, and Prof. L. A. Olney, Chairman Research Committee; and Secretary Alex Morrison.

The reading of the Secretary's report of the Fifty-sixth Council Meeting was waived, as it was published in the Proceedings of February 4, 1929.

The Secretary reported that a meeting of a few members of the Association had been held at the Lowell Textile Institute on February 6, 1929, for the purpose of organizing the Association as a corporation. The reading of the minutes of this meeting was waived on account of lack of time and pressure of other business, but they are given herewith:

Meeting for Organization of Corporation of American Association of Textile Chemists and Colorists

Lowell Textile Institute, Lowell, Mass.
February 6, 1929

A meeting of the following:

George A. Moran, 98 Massachusetts Avenue, North Andover, Mass.
Lawrence F. Ryan, 16 Argyle Street, Andover, Mass.
John H. Shinkle, 295 Appleton Street, Lowell, Mass.
Harold W. Leitch, 11 Locke Street, Andover, Mass.
Paul J. Shoquette, 89 Butterfield Street, Lowell, Mass.
Charles L. Howarth, Colson Street, North Billerica, Mass.
Alexander Morrison, 5 Canterbury Street, Andover, Mass.
Harold C. Chapin, 290 Pine Street, Lowell, Mass.
Clarence L. Nutting, P. O. Box 172, Salem Depot, N. H.
Hugh Christison, 80 Pleasant Street, Methuen, Mass.
Louis A. Olney, 118 Riverside Street, Lowell, Mass.

members of the Association, was held at the Lowell Textile Institute, Lowell, Mass., February 6 at 8:15 p. m., an agreement of association having been previously made out and signed by the same eleven members, in which the seven days' notice of the first meeting of the organization was waived and the above time of meeting designated.

Prof. Louis A. Olney was duly nominated and unanimously elected temporary chairman.

Dr. Harold C. Chapin was nominated and unanimously elected by ballot temporary clerk.

Dr. Harold C. Chapin was next sworn to the faithful and impartial discharge of the duties of his office by Bertram Grenville, notary public, of Methuen, Mass.

It was moved, duly seconded and voted that the constitution of the American Association of Textile Chemists and Colorists as printed in the Year Book should be adopted as the constitution of the incorporated association.

Winthrop C. Durfee, of Boston, was nominated and elected Treasurer by ballot.

Alexander Morrison was nominated and elected Secretary by ballot.

Messrs. Durfee and Morrison, together with George B. Moran and Hugh Christison, were duly nominated and elected councilors by ballot.

Alexander Morrison was then sworn to the faithful and impartial discharge of the duties of his office by the above-mentioned Mr. Grenville.

Attest:

(Signed) HAROLD C. CHAPIN,
Temporary Clerk.

The meeting adjourned at 9.05 p. m.

Attest:

(Signed) ALEXANDER MORRISON,
Secretary.

Meeting of the Councilors Following Meeting of Organization of Corporation

Lowell Textile Institute, Lowell, Mass.
February 6, 1929

FOLLOWING the adjournment of the meeting of Organization of Corporation at Lowell Textile Institute, Lowell, Mass., February 6, 1929, at 9:05 p. m., the three councilors present, George A. Moran,

105

Reproduction of page in the Proceedings reporting incorporation of AATCC.

consignment was received at Manchester, England on May 23, 1952. The *Colour Index* contract was signed, with appropriate ceremonies, on January 18, 1952 by President Rabold and Secretary Chapin. At the Council meeting on June 13, 1952 proposals from the Society to take advance subscriptions to the *Colour Index* at reduced prices were considered and again on September 12th. On January 16, 1953 the Council approved the prepayment plan.

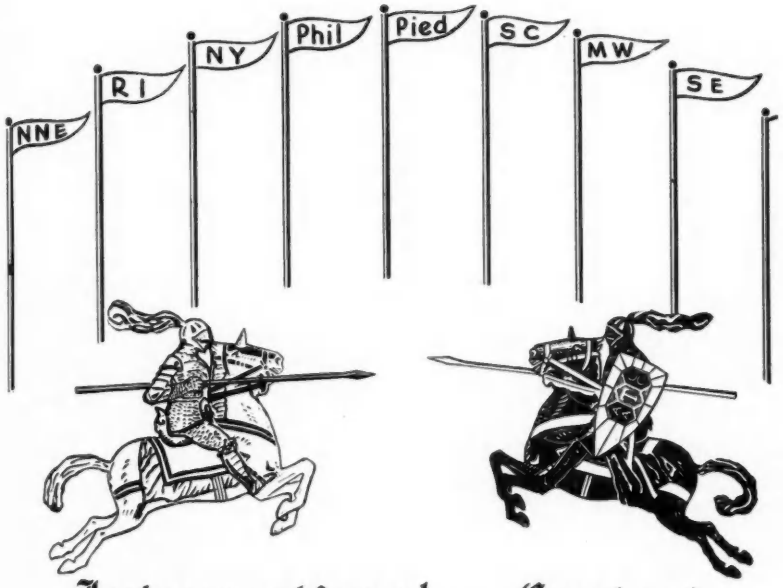
MONOGRAPHS——The Association has published two monographs: the first was "Analytical Methods for a Textile Laboratory" published in 1949 with Percival Theel as chairman of the committee. This is now being revised and a second edition will appear shortly. The second monograph was "The Application of Vat Dyes", which was published in 1953 with Raymond W Jacoby as chairman of the Committee and Henry A Rutherford as editor-in-chief.

CONVENTIONS

Since its inception, conventions have been an annual feature of the AATCC excepting the years during World War II when travel was restricted. Through a series of trials and errors, certain features which we now take for granted were incorporated. The technical meetings have been the backbone of these conventions and they still remain so. We have also always had an annual banquet. Other regular features have since been added, such as the Intersectional Contest sponsored by Henry F Herrmann, (see details of this contest and past winners elsewhere in this issue), Olney Medal Award Luncheon, Personnel Service and Alumni Luncheon. Special features have been introduced from time to time during the years depending upon the particular attractions of the city where the convention was being held.

Arrangements for the earlier conventions called for them to be run and operated on a strictly local or sectional basis. Through the Council, a section would invite the Association to hold its next annual meeting in that locale. On the acceptance of the Association, all arrangements were then handled directly by the sponsoring section. The birth of the National Convention Committee lay in the concept that some means should be found to take advantage of the experience and knowledge gained by the convention chairman and their committees so that it could be passed on to future chairmen. This was accomplished by means of written reports from the chairmen of the various committees for each convention. The National Convention Committee incorporates them into a "Convention Bible" which is available to each new chairman. The Committee is composed of chairmen of past conventions and their experience is thus of immense value. Future plans call for the conventions to be sponsored by regions rather than individual sections.

PERKIN CENTENNIAL——The most ambitious convention yet organized is the Perkin Centennial of this year. Work on this event has been almost constant since January 16, 1953 when the Council appointed Raymond W Jacoby to investigate the possibilities of sponsoring a Perkin Centennial in 1956. On April 17, 1953 the Council voted that a Perkin Centennial be held in the Waldorf-Astoria, New York, during the week of September 10, 1956 which would include the annual convention of AATCC and participating cooperation of other professional organizations. Mr Jacoby was subsequently appointed by the president as chairman of the Executive Committee. On September 17, 1953 Mr Jacoby reported cordial responses from other organizations invited to participate in the Centennial. On November 20, 1953 the president was authorized to appoint a treasurer for



Intersectional — Contest

FEATURING the technical program at the twentieth annual meeting and convention will be a contest in which each section will present a paper in competition with the other sections. These papers will be based on original, scientific or technical investigations of interest to textile chemists and colorists, either directly or indirectly. The contest is scheduled to be held on Friday afternoon, October 18th, and the names of the judges will be announced later.

Many of the sections are already at work preparing their papers, the titles of which appear below.

An award for the best paper presented will be made at a luncheon to be held at the New York World's Fair on October 20th, which has been set aside as a "Special Day" for this association.

Following is a list of titles submitted to date by the various sections:

Northern New England—"What is New in New England."

Rhode Island—"The Effect of Modern Finishing Agents on the Light Fastness of Cotton Colors."

Philadelphia—"Variables Encountered in Fadeometer Testing."

Piedmont—"Screen Printing in the South."

Southeastern—"Some Observations on the Tendering of Vat and Naphthol Dyed Army Duck on Total Exposure to Weathering."

Annual Meeting and Convention
October 18th, 19th and 20th, 1940

July 22, 1940 P375

Reproduction of the first announcement concerning the Intersectional Contest

the Centennial and a loan was approved for advance expenses. A meeting of the General Committee was held on January 15, 1954 at which rather definite plans were formulated. On June 15, 1954 Mr Jacoby reported that a program of 22 topics had been arranged by 26 associations other than our own. This program was published on September 13, 1954. At the Atlantic City Convention in 1955 Mr Jacoby reported: "Never before has any professional society embarked upon such a comprehensive undertaking. Never before have so many professional societies cooperated in such a joint effort. The participating societies have a total membership of over 200.000 individuals and over 3.000 companies. They have all entered upon the program with real interest and enthusiasm, which indicates the extent of the conviction that the one-hundredth anniversary of Perkin's discovery of mauve demands special recognition." The results of the past four years of planning and working will be evident at this year's Centennial.

RESEARCH AND COOPERATION WITH OTHER SOCIETIES

RESEARCH COMMITTEE——At the very first Council meeting on November 18, 1921 at the Engineers' Club in Boston a Research Committee was formed which consisted of the eleven officer members of the Council plus four additional members with further additions as deemed advisable. This Committee was to supervise all research of the Association and it is significant that by special vote this Committee was authorized "for the time being" to also supervise the work of standardization. As a matter of fact, this work became the first and most important research job which is not yet finished in 1956.

The first meeting of the Research Committee was held on December 9, 1921 at the Engineers' Club in Boston and Dr Olney was elected its first chairman which position he held until 1948 when he was succeeded by J Robert Bonnar.

No attempt will be made here to cover all of the research activities of the Association. A glance at the current *Year Book* will indicate the vast scope of this undertaking through the number of persons involved on the various committees and the test methods which have been adopted. It will be difficult to estimate the many dollars and hours that have been contributed to this effort.

The Association has always been active in its cooperation with other societies, both here and abroad. As early as October 7, 1927 Dr E H Killheffer was appointed the representative of the Research Committee to confer abroad with the English, German and French committees in an effort to perfect fastness tests which would be international in scope.

TEXTILE RESEARCH INSTITUTE——The matter of cooperation with other societies received added emphasis in 1928 when Dr Killheffer suggested the formation of a central research and technical bureau. This matter occupied the attention of the Council, Research Committee and members for several years. The Council, at its meeting on October 26, 1928 voted that a postal questionnaire be sent to the entire membership to ascertain their views in regard to the establishment of a general body for research in the textile industry. The replies indicated a 9 to 1 vote in favor of the proposal. A committee was appointed to study the matter. At the business meeting of the Association in December of 1929 it was voted that the sum of $1,000 be appropriated for expenses of a committee whose duty it would be to develop the idea of a general body for research in the textile industry. P J Wood was appointed chairman of this committee, which was to work with committees from other associations. Following an invitation from the Textile Research Council, the AATCC committee met with committees from other associations in Boston the following April.

Proceedings of the American Association of Textile Chemists and Colorists

Report of Executive Committee on RESEARCH*

At the last Council meeting considerable discussion arose concerning the contemplated drive for corporate memberships. This discussion led to expression of opinion as to the future of the AATCC with respect to enlarging the research program. Particular emphasis was given to the concentration of the AATCC research on standard test methods for textiles. After many varied expressions of opinion from the floor, it appeared that the matter should be thoroughly reviewed at this time to preserve the present outstanding position of the AATCC in the textile field. It was voted that the Chairman of Research appoint a committee to report to the Council on research policy and program. Professor Olney reported back to the Council before the meeting adjourned, the appointment of the following members to serve on the committee:

Messrs. Leonard S. Little; P. J. Wood; William D. Appel; Thomas R. Smith; J. Robert Bonnar with Professor Olney as member ex-officio.

Professor Olney further stated that this committee would serve as the Executive Committee on Research.

This committee was charged to report to the next Council meeting with definite recommendations pertaining to the future of research by the AATCC. The committee, after having elected Mr. Little as Chairman, and Mr. Bonnar as Secretary, has held several meetings, and does now report as follows:

PERMANENT EXECUTIVE COMMITTEE ON RESEARCH

During the past twenty-odd years the activities of the Research Committee have increased so rapidly that it is fast getting to the point where it will soon be, and probably is already, beyond the power of one man to oversee satisfactorily. Coupled with this fact, the man who has until now very efficiently headed this work feels that he must gradually be relieved of these duties. It is, therefore, recommended that:

(1) Either this present committee or a new one be appointed to be a permanent Executive Committee on Research.

This committee should report to the Council and should consist of three duly appointed members and in addition the Chairman of the Research Committee, the President of the Association and the retiring President who is to be a member until the next outgoing president succeeds him. The appointed members of the original committee should serve for three years, after which one appointed member will drop out each succeeding year for three years, each being replaced by a member appointed for three years. The committee will recommend to the Council a new member to fill any vacancy. The Chairman of this committee is to serve as Chairman not over three years.

The Executive Committee on Research shall be responsible for the general research policy of the Association, for the organization and the operation of the employed research staff, including the Director of Research, when and if a full-time paid director is appointed. The committee should appoint the members of the Research Committee and the various sub-committees working under it.

RESEARCH OBJECTIVES

One of the main objectives of the AATCC is to carry out in a practical way research work of vital importance to the Textile Industry, and only by so doing can the AATCC take its rightful position and become the authority we desire it to be.

It is felt that the immediate emphasis of our research work should be on the establishment of standard test methods for textiles, which should have a two-fold use; namely, practicability to our own members as far as their own work is concerned and adoption by industry and the public where finished textile fabric test methods are involved. The latter will be achieved only through proper publicity. If we reach this goal of being the authority for standard test methods for textiles, we feel that other associations will turn their research efforts in other directions, rather than investigate such problems which naturally fall within the scope of our pronounced research endeavor.

PRELIMINARY RESEARCH ORGANIZATION

The committee feels that there should *immediately* be obtained to supplement Mr. Ryberg, the present Research Associate who should oversee the technical laboratory work carried out by the association, certain additional personnel. It, therefore, is recommended that:

(2) There be engaged an Assistant Research Associate at approximately $2,500 per year.

(3) There be engaged two laboratory assistants each at approximately $1500 per year.

(4) There be engaged a clerk or research secretary at $1,800 per year.

Adding to this an arbitrary amount of $1,200 per year for traveling and incidental expenses, plus $1,000 for equipment, we arrive at the expenditure of approximately

* Submitted to Council, January 21, 1944.

P82 AMERICAN DYESTUFF REPORTER

Reproduction of the first page of the report of the Executive Committee on Research.

Further organization took place in May in New York and on November 6th the first annual meeting of the U S Institute for Textile Research was held at the Murray Hill Hotel, New York and a permanent organization was established. It was pointed out at a later meeting of the Council and Research Committee that the AATCC was one of many similar organizations, representatives from which had been united and formed into the new association for the purpose of carrying on textile research on a much broader scope than would be possible by any of the independent associations.

The sum of $1,000 which had been appropriated for the use of the committee which investigated the possibilities of a general body for textile research had not been touched and it was voted that this sum be used for a life membership in the new Institute with the stipulation that it be placed in the permanent fund. In 1937 a proposal was made by the U S Institute for Textile Research to the Textile Foundation, calling for the formation of a Textile Research Institute. This proposal became an eventuality and at the Council meeting on April 18, 1942, it was voted that the $1,000 originally paid by the Association for the life membership in the U S Institute for Textile Research be retained in the endowment fund of the Textile Research Institute.

INTER-SOCIETY COLOR COUNCIL——Another society in which the Association participated in organizing was the Inter-Society Color Council. At a meeting of the Council on January 16, 1931 a committee was appointed to represent the Association at a Preliminary Conference on Organization of an Inter-Society Committee on Color Specifications to be held in New York on February 26th. At the Preliminary Conference it was voted to form an Inter-Society Color Council to be composed of delegates appointed by national societies and associations interested in the description, specification and standardization of color. The AATCC committee members were named permanent delegates and at a subsequent meeting the Color Council was organized and the AATCC became a member association.

OTHER MEMBERSHIPS——On October 15, 1937 the Council voted that the AATCC subscribe to a three-year associate membership in the National Farm Chemurgic Council. AATCC has taken an active interest in the American Standards Association. On February 11, 1939 the Council voted to become an associate member of ASA and on April 18, 1940 AATCC was invited to become a member of the Advisory Committee on Ultimate Consumer Goods.

INFORMATIVE LABELING——On February 11, 1939 the Committee of Coordination of Standards presented its recommendations regarding informative labeling to the Council. This subject had become much discussed during those days. The committee recommended that the AATCC should not sponsor any privately organized system of labeling; it should not itself set up a laboratory for commercial or umpire testing; it should give definite recognition to an increasing demand for some form of informative labeling by bringing up to date all tests devised by the AATCC, by immediately improving or completing tests still in the provisional group, by amplifying or interpreting the tests to make them understood and suitable for use by other groups including merchandisers and consumers, by printing in pamphlet form for rather widespread distribution the tests with instructions as to their use and interpretation, and by assigning a man full time to carry out this program. The Council on September 15th voted that such a man be assigned and this was done.

In the December 9, 1940 issue of the *Proceedings* an article entitled "Informative Textile Labeling" was published which outlined the situation at that time. The paper was presented in the intersectional Contest by the New York Section with Henry F Herrmann as chairman of the New York Committee. In the December 2, 1946 issue, in an informative and authoritative article, Mr. Herrmann reviewed the progress of informative labeling for the preceding 25 years and pointed out the fact that the AATCC was the largest textile technical association in the world and that its standards and fastness tests were accepted by all American firms and by government agencies, and were finding increasing use by foreign organizations.

During 1940 the AATCC cooperated with the National Association of Finishers of Textile Fabrics' Technical Committee on a draft of fastness tests for light for all textiles, and classifications based on those tests for use in labeling. The Research Committee also participated in the revision of Woven Dress Fabrics—Testing and Reporting, Commercial Standard CS-59-39. They also cooperated in later revisions of this standard. On October 10, 1942, following discussions of recent Federal Trade Commission hearings on "Proposed Trade Practice Rules Relating to the Colorfastness of Textiles", the Council voted that the AATCC continue to cooperate with the American Standards Association Committee L-14, with the reservation that our Association was concerned with tests rather than policies.

RESEARCH POLICY——At the Council meeting on October 22, 1943 a committee was appointed to report to the Council on research policy and program. This committee was charged with the assignment of modernizing the Association's research structure with the intent of intensifying its work. In its report to the Council on January 21, 1944 the committee recommended that the primary object of the Research Committee continue to be the maintenance of the position of the Association as the authority on textile test methods in its field, but not to the exclusion of other research. They further recommended that the present laboratory staff at the Lowell Textile Institute be augmented and that, in addition, a full-time Director of Research be appointed. They further recommended that the responsibility for instituting and maintaining this enlarged program be vested in an Executive Committee on Research. The reporting committee was elected the initial Executive Committee on Research, and Leonard S Little became its first chairman. This committee is responsible for the general research policy and program of the Association and for the organization and operation of the employed staff. This committee accepted facilities which had been offered to the Association at the Lowell Textile Institute and on December 1, 1945 Dr Harold W Stiegler was appointed full time Director of Research and is still in charge of the Association's laboratory and personnel at Lowell.

The ECR proposed a budget of $35,000 and, in order to underwrite this it was necessary for the National Committee on Corporate Membership, under the Chairmanship of Henry F Herrmann, to inaugurate a well-coordinated drive for new corporate members. During 1944 it was reported that there were an additional 150 corporate members over 1942 and in many instances the contributions of old members had been increased. At the present time efforts are still continuing to secure new corporate members, as well as to increase contributions of old members. All of these funds are earmarked for research.

On June 5, 1944 it was reported in the Proceedings that an agreement had been reached with the Textile Research Institute to avoid any danger of duplication of effort. The TRI would undertake research work, both

fundamental and applied, on all phases of textile manufacture. AATCC would be concerned primarily with the wet processing of textiles and would be preeminent in the development of standard test methods for the use of the textile chemist, dyer, colorists, finisher, converter and consumer.

GOVERNMENT COOPERATION ———At the Council meeting on June 21, 1940 a committee was appointed to offer the facilities and advice of the Association to the Federal government and its agencies in the defense program. These services were eventually offered by the Advisory Committee to the Council of National Defense. At a meeting of the Research Committee on June 14, 1941, consideration was given to the appointment of a committee to confer with the Philadelphia Quartermaster Depot of olive drab dyeing of wool.

All during World War II the Association continued to cooperate closely with various government agencies and in recognition of these efforts the following letter was received by the Association's President:

Army Service Forces
Office of the Quartermaster General
Washington 25, D C

27, December, 1945

Mr William D Appel, President
American Association of Textile Chemists and Colorists
National Bureau of Standards
Washington 25, D C

Dear Mr Appel:

This office wishes to express its appreciation and commendation to you and to the officers and members of the American Association of Textile Chemists and Colorists for the many contributions afforded the Quartermaster Corps during the war years.

The activities of the Research Council and the several subcommittees have been of material assistance in the development and evaluation of textile testing procedures for military usage. Similarly, we believe, some of the testing techniques which have been developed by the Quartermaster Corps, many of them in conjunction with officers and members of the AATCC, will undoubtedly help in advancing the establishment of suitable standards in the field of civilian textiles.

I personally want you to know that your contributions to the work of our office will long be remembered and recognized by the Quartermaster Corps as playing an important part in the total effort to bring victory to our Country. It is hoped that you will continue to be interested in our post-war program of improving existing Quartermaster items and in research and development of new ones.

Very truly yours,
Georges F Doriot
Brigadier General, QMC
Director, Military
Planning Division

The extent of the cooperation of AATCC with government agencies and other agencies was pointed out by President William D Appel when he stated at the Silver Jubilee Convention in Boston in December of 1946:

". . . The development of an O D No. 7 shade on cotton having maximum fastness was undertaken for the Office of the Quartermaster General and research on gas-resistant fabrics and clothing was undertaken for the Chemical Corps . . . The Association is sponsoring a Commercial Standard on the flammability of clothing textiles in cooperation with the National Retail Dry Goods Association. It is sponsoring a Commercial Standard on insect-proofed fabrics, felts, and yarns, in cooperation with the American Society for Testing Materials and the National Association of Insecticides and Disinfectant Manufacturers, Inc. It sponsored a discussion session on colorimetric standardization of the colors of the Textile Color Card Association of the U S, Inc, at the meeting of the Inter-Society Colour Council last May."

OPERATION CUE ——— The AATCC sponsored a project on the effect of thermal radiation from atom bomb explosions on textiles. Charles W Dorn, Chairman of the AATCC Executive Committee on Research, initiated participation in the Federal Civil Defense Administration's "Operation Cue", an open shot in the Spring 1955 series of atomic detonations on Yucca Flat, Nevada Test Site of the Atomic Energy Commission. Dr H W Stiegler, AATCC Research Director, was appointed Project Officer and with Industry Advisors, Messrs C W Dorn, P J Fynn, E R Kaswell and Army Quartermaster observer D Feldman, set up a program with test lines at 7000, 8000 and 9000 feet from ground zero.

The objective of the test was to develop information about the behavior of textiles and colors when subjected to the high thermal energies of atomic detonations. Information sought included physical changes and appearance such as color, scorching, melting and burning as well as the influence of textiles and colors on heat penetration through layers of clothing to the wearer.

Three hundred plaques were exposed. On these were mounted textile fabrics in single and multiple layers, containing natural and synthetic fibers in colors ranging from white through pastel, medium and dark shades. Prints and chemical finishes were included.

Seventy-five mannequins, fully dressed in typical clothing, were exposed on the desert and within various types of furnished homes and auto trailers.

Valuable and interesting information was obtained and submitted to the Federal Civil Defense Administration.

A Public Service Award from the Federal Civil Defense Administration was presented to the AATCC for its contribution to this project.

ISO ACTIVITIES———The Association accepted an invitation from the American Standards Association to join an American delegation of technical and commercial organizations to attend the first meeting of the Committee on Textiles of the International Organization for Standardization which was to be held on June 7-12, 1948 at Buxton, England. J Robert Bonnar was appointed the AATCC representative. Reporting on this meeting, Mr Bonnar stated that the AATCC would be very predominant in the work for the U S delegation covering the subcommittee on color fastness tests, with particular respect to light, washing and perspiration and the subcommittee on shrinkage of fabrics in washing. Progress was reported on these tests by Mr Bonnar to the Council on October 13, 1949. Informal ISO meetings were held in Brighton, England in June of 1951 and the ISO Conference was held in Bournemouth, England at which Leonard S Little and C Norris Rabold were AATCC representatives. Messrs Rabold and Little reported to the Council on June 26th and emphasized the remarkable cooperation which was found and also the willingness to compromise. On November 16th Mr Little reported on proposals for compromise standards, to be completed by December 15th in preparation for the ISO meeting of the following June in New York. William D Appel was appointed to head the AATCC delegations at the June meeting. Tests for colorfastness of textiles under consideration by the ISO were published December 21, 1953 and were the result of cooperative work for five years. Messrs Appel and Little and Jackson A Woodruff were the American delegates to the June, 1954 conferences in England and on his return Mr Little reported that 35 tests for colorfastness had been tentatively approved as international standards, 3 were subject to further check and 6 were withdrawn. The ISO proposals on methods for testing colorfastness of textiles were published March 12, 1956. William D Appel was the delegate to ISO conferences in England this past May and further meetings are scheduled for September 6, 7 and 8, preceding the Perkin Centennial.

RESEARCH CHAIRMEN ——— Leonard S Little was first chairman of ECR and was succeeded on December 12, 1946 by J Robert Bonnar. On June 6, 1947 the resignation of Dr Louis A Olney as first chairman of the Research Committee was accepted and Mr Bonnar was appointed to succeed him on January 9, 1948. Dr Olney had served as chairman of the Committee since its inception and, with the exception of two meetings, had attended and presided over the 151 meetings. Mr. Bonnar's resignation as Chairman of ECR and the Research Committee, effective at the end of the year, was accepted at the Council meeting on September 28, 1950. Leonard S Little was appointed to succeed Mr. Bonnar in both positions. On September 12, 1952 Mr Little relinquished his duties as chairman of the general Research Committee to Charles W Dorn. On April 17, 1953 the name of the general Research Committee was changed to Technical Committee on Research. At the January, 1956 meeting of the Council, Mr Dorn was appointed chairman of ECR succeeding Mr Little and Charles A Sylvester was appointed chairman of TCR succeeding Mr Dorn.

INTER-SOCIETY RELATIONS ——— On September 21, 1955 the Council approved a committee to promote and regulate inter-society relations. Dr Carl Z Draves is chairman of this committee.

HONORED MEMBERS

William K Robbins was elected the first honorary member of the Association at a meeting of the Council on October 25, 1929. Others elected subsequently were Walter E Hadley, Hugh Christison, William R Moorhouse and William H Cady.

At the annual meeting in Chattanooga on December 6, 1930 the following resolution was unanimously carried:

"Whereas, the splendid record of service to the American Association of Textile Chemists and Colorists by its founder and first president, Dr. Louis Atwell Olney, merits special recognition by the Association, be it "RESOLVED", that our founder and first president, Dr Louis Atwell Olney, be designated President Emeritus of the American Association of Textile Chemists and Colorists and a life member of the Council."

Since then, the constitution has been amended so that, upon election, a President automatically becomes a life member of the Association and upon retirement a life member of the Council.

At the Council meeting on March 25, 1949 a resolution in memory of Dr Olney, naming him the Founder of the Association, was voted. It was also voted that the library of the Association be known as the Olney Memorial Library.

ADMINISTRATION

For many years all of the activities of the secretary's office were carried out on a volunteer basis. In December, 1933 Dr Harold C Chapin was appointed part-time secretary and on June 6th, 1947 was appointed full-time secretary of the Association. With his resignation this past August 1st he was just short of serving the AATCC for 23 years. Richard R Frey was appointed assistant secretary in 1954 and this year George P Paine was elected executive secretary and assistant treasurer.

The duties of the treasurer's office have always been on a volunteer basis. William R Moorhouse served as treasurer for 21 years and was elected treasurer emeritus by the Council on September 17, 1953 and was succeeded by Albert E Sampson.

The offices of the secretary and the Association laboratories have been located, without charge, at the Lowell Technological Institute for many years. At the Council meeting on November 20, 1953 the president reported on a personal inspection trip of the facilities at Lowell and that it was his opinion, as well as that of the other executive officers that no move be contemplated from Lowell. On September 21, 1955 President Martin J Lydon, of the Institute, presented an invitation to the Council to occupy executive offices and laboratories in a contemplated new building at Lowell. The Council accepted this offer, signifying its intention of occupying these quarters for at least five years, though in the event of late occupancy, not necessarily later than September, 1963.

SERVICES

A personnel service for members of the Association was established at the Convention in Atlantic City, October 12-14, 1944 under the direction of Dr Miles A Dahlen. The purpose of this service was to provide a convenient method by which employers and candidates for employment could meet and discuss possible employment arrangements on a private basis. This continues to be a function at each national convention under the supervision of the secretary, Dr Harold C Chapin.

As a service to members, the Association, early in 1933, inaugurated the Unemployment Register. Members were invited to place their qualifications on file with the Secretary and employers were requested to file any vacancies which might occur. This service is still continued for members but is now named the Employment Register.

AWARDS

AATCC PRIZES———At the annual meeting on December 2, 1922 it was voted to offer from the funds of the Association, and in any amount not exceeding $100 total in any fiscal year, prizes for the furtherance of the objects of the Association.

OLNEY MEDAL———At the Council meeting on June 19, 1943 an offer was received from the Howes Publishing Company to endow the annual award of a medal. On October 22nd it was voted to accept the offer and the Olney Medal was established. The medal is awarded to afford public recognition of outstanding achievements and contributions in the field of textile chemistry and as a testimonial to Dr Louis A Olney, Founder of the AATCC, in recognition of his lifetime of devotion and multitudinous contributions in his field. The first Olney Medal was awarded to Dr Olney himself at the convention in Atlantic City, October 14, 1944. Medals have been awarded since as follows:

1945—Milton Harris
1946—William H Cady
1947—Edward R Schwarz
1948—Harold M Chase
1949—Charles A Seibert
1950—George L Royer
1951—Raymond W Jacoby
1952—Werner von Bergen
1953—Roland E Derby
1954—William D Appel
1955—Miles A Dahlen
1956—Walter J Hamburger

AMERICAN DYESTUFF REPORTER AWARD—At the Council meeting of June 9, 1949 the Howes Publishing Company offered to endow an AMERICAN DYESTUFF REPORTER Award in memory of Alfred P Howes for the best paper presented before a local or national meeting of the Association. This offer was accepted and the Award has been presented to the following:

1951—Mason Hayek and Fred C Chromey
1952—Charles J Lyle, Joseph J Iannorone and Robert J Thomas
1953—Robert H Blaker
1954—Charles L Zimmerman
1955—Henry E Millson

STUDENT AWARD—On January 28, 1949 the Council voted that an award be made each year in each institution having a Student Chapter of the Association, to that member of the graduating class judged by the textile chemistry department of the institution to have done the best work in the field of textile chemistry during his college career; the award to consist of membership in the Association for the dues year following graduation, and a book awarded at the time and place of other awards and honors in the institution. In this book and in the *Year Book* going with the membership, would be inserted book plates designed by P J Wood, bearing the seal of the Association. Winners have been as follows:

1949

Robert J Pierent — Lowell Technological Institute
Samuel Helfand—New Bedford Institute of Textiles and Technology
Miriam Murphy—Bradford Durfee Technical Institute
Marvin H Smith, Jr—Georgia Institute of Technology
Solomon P Hersh—North Carolina State College
Joseph P Clancy—Clemson College
Gordon Loeb—Philadelphia Textile Institute

1950

Frederick M Hornyak — Lowell Technological Institute
J Raymond Nisbet—New Bedford Institute of Textiles and Technology
Donald T Tweedy—Bradford Durfee Technical Institute
Robert R Stewart, Jr—Georgia Institute of Technology
John G Templeton—North Carolina State College
Thomas L Howle, Jr—Clemson College
Richard N Combs — Philadelphia Textile Institute
Armand Di Meo—Utica Technical Institute

1951

Walter P Dean, Jr — Philadelphia Textile Institute
Anibal L Ferreira—New Bedford Institute of Textiles and Technology
George H Fisk—Georgia Institute of Technology
Lynwood I Gibson—Bradford Durfee Technical Institute
Ernest Larrat, Jr—Utica Technical Institute
Ludwig Rebenfeld — Lowell Technological Institute
Edward A Schlirf—North Carolina State College
Walter Lee Thompson — Clemson College

1952

Warren S Clapp—Philadelphia Textile Institute
Robert A Pearson—New Bedford Institute of Textiles and Technology
Lindsay P Dixon—Georgia Institute of Technology
Norman B Weinstein — Bradford Durfee Technical Institute
Herbert M Kagi—Utica Technical Institute
Haig C Donoian—Lowell Technological Institute
Arturo M de Nicolas—North Carolina State College
Coy J Gray—Clemson College
Robert S Zecker—Fairleigh-Dickinson College

1953

Jack W Burnette—North Carolina State College
William P Creighton—Clemson College
David B DeMassa—Utica Technical Institute
Joseph P Flannery—Lowell Technological Institute
Clyde C Lunsford—Georgia Institute of Technology
Edward W Makuch—Bradford Durfee Technical Institute
Frederick P McKenna—Rhode Island School of Design
Joseph R Nosal—Fairleigh-Dickinson College
Robert J Olson—Philadelphia Textile Institute
Harold G Ward—New Bedford Institute of Textiles and Technology

1954

Armand L Greenhall—Lowell Technological Institute
Donald C Dohner—North Carolina State College
Edmund A Zavaglia—Philadelphia Textile Institute
James H Siddall, Jr—New Bedford Institute of Textiles and Technology
Enrique S Pels—Georgia Institute of Technology
William F Moore, Jr—Clemson College
William H Marsden—Bradford Durfee Technical Institute
James M Polito—Fairleigh-Dickinson College
Albert J Strumar — Rhode Island School of Design

1955

Mrs Nancy G Garvey — Lowell Technological Institute
William G Crutchfield—North Carolina State College
Wallace H Nuttall — Philadelphia Textile Institute
Mrs Betsy B Gillin—New Bedford Institute of Textiles and Technology
John E Lancaster—Georgia Institute of Technology
Joseph F Mattison—Clemson College
Francis A Flynn—Bradford Durfee Technical Institute
Marvin Eichenblatt — Fairleigh-Dickinson College
Letitia F Meinhold—Rhode Island School of Design

AATCC Calendar

COUNCIL
Sept 12 (New York, N Y); Nov 16, Jan 18 (New York); Mar 29 (Roanoke, Va); June 7 (New York)

NATIONAL CONVENTIONS
Sept 13-15, 1956 (Waldorf-Astoria, New York) (as part of the Perkin Centennial, Sept 10-15); Nov 14-16, 1957 (Hotel Statler, Boston); 1958 (Hotel Conrad Hilton, Chicago); 1959 (Sheraton Park and Shorehaam Hotels, Washington, D C)

MID-WEST SECTION
October 27, February 16 (Hotel Bismarck, Chicago, Ill)

NORTHERN NEW ENGLAND SECTION
Sept 28 (Annual Outing—Washusett Country Club, West Boylston, Mass); Oct 19 (Science Park, Boston, Mass); Dec 1 (Annual Meeting—Hotel Vendome, Boston)

PHILADELPHIA SECTION
Sept 28 (Abraham Lincoln Hotel, Reading, Pa); Nov 2 (Drake Hotel, Philadelphia, Pa); Dec 7 (Kugler's Restaurant, Philadelphia, Pa)

PIEDMONT SECTION
Oct 6 (Annual Meeting—Hotel Charlotte, N C)

RHODE ISLAND SECTION
Oct 18 (Johnson's Hummocks Grille); Dec 6 (Annual Meeting, Johnson's Hummocks Grille)

SOUTH CENTRAL SECTION
Dec 1 (Hotel Patten, Chattanooga, Tenn)

SOUTHEASTERN SECTION
Sept 22 (Columbus, Ga); Dec 8 (Atlanta, Ga)

WESTERN NEW ENGLAND SECTION
Oct 5 (Annual Meeting—Hartford, Conn); Nov 16 (Rapp's Restaurant, Shelton, Conn)

THE SECOND EDITION
of
THE COLOUR INDEX
IN FOUR VOLUMES

published by

The Society of Dyers and Colourists

and

The American Association of Textile Chemists and Colorists

The work has been completely re-designed and brought up-to-date with the co-operation of all the dye manufacturers in Great Britain, America, Western Europe, India and Japan. The 2nd Edition is in three main parts.

PART I— consists of two volumes each of approximately 1,000 pages. It deals with all commercially homogeneous dyes and pigments in current use (approximately 4–5,000 dye entities and 25,000 commercial names) within groups relating to their main usage, e.g. Disperse, Acid, Azoic, Direct, Pigment, Solvent etc. The data included comprises the commercial name and manufacturer's initials, methods of application, fastness properties, established usages, reactions on the fibre and literature references relating to application. In the absence of a single accepted international system of fastness assessment it has been necessary, in this Edition, to make provision for the inclusion of data according to one or more of the following—

A—(American) The methods of The American Association of Textile Chemists and Colorists.
B—(British) The methods of The Society of Dyers and Colourists.
C—(Continental) The methods of the Deutsche Echtheitskommission.

An important feature of PART I is the sub-division of each usage group into hue groups— Yellow, Orange, Red, Violet, Blue, Green, Brown and Black. The hue classification has been made by reference to a Hue Indication Chart which has been designed specially for the purpose. A copy of the chart is included with each set of volumes.
Each dye or group of identical dyes carries a PART I serial name and number, e.g. **C.I. Vat Orange 1**, and also a five digit PART II number in those cases where the chemical constitution of the dye is known.

PART II— is one volume of approximately 700 pages. It contains data relating to chemical constitution, method of preparation, patent and literature references relating to manufacture or constitution, solubilities and reactions in substance for approximately 3,800 dyes and pigments. The 1st Edition recorded 1,316 constitutions, and this very big increase is partly due to the fact that many co-operating dye manufacturers have, for the first time, disclosed the constitution of certain of their dyes. In addition there is the information contained in the reports compiled by Allied Investigating Commissions on the German Dyestuff Industry.
The dyes are arranged in order based on their chemical constitution following broadly the lines of the 1st Edition. A number of refinements have been introduced and there are two new sections, viz— AZOIC (the coupling components and the diazo components for the production of Insoluble Azo dyes on the fibre) and PHTHALOCYANINE.
Each entry carries a five digit reference number. These numbers do not progress in unit steps as provision has been made to allow the insertion of new constitutions in later editions or supplements without having to change the numbers now allocated in the 2nd Edition. Each entry also carries the complementary PART I serial name and number thus providing easy cross reference to the data in PART I. It also contains alphabetical and empirical formula indexes to all the Intermediates relating to individual dye entities.

PART III— is one volume of approximately 400 pages containing the general index to PART I and PART II (see CONTENTS, [iv]). The Commercial Names Index includes the names (in italics) of dyes not in current use, many of which are related to data in PART I and/or PART II.

EXAMPLE OF ENTRY IN PART I

C.I. 69025 Anthraquinone **C.I. Vat Orange 1**

APPLICATION

DYEING

Method		Leuco Compound
A/Q1	□	Alkaline, orange brown
A/Q2	■	Acid, brownish yellow
A/Q3	◘	
Indigoid	□	

Vat in short liquor

Properties (Cotton) Affinity and levelling, good. For data on strike, levelling and migration see *JSDC*, **66** (1950), 505

Suitable for pigment pad-jig, pad-steam, continuous piece and vat-acid processes

Cotton Affinity and levelling good. Dead cotton covered fairly well

Viscose Good affinity at low temperature; at high temperature the hue is redder and duller

Cotton/Viscose Good solidity when dyed cold. At 50°C viscose dyed heavier than cotton

Silk Suitable

PRINTING

Cellulose Applied by normal processes giving redder and duller hues than when dyed. Dischargeable in pale and medium shades in the presence of an assistant

FASTNESS PROPERTIES etc

	A	B	C
Cross Dyeing (Chrome)	..	5	5
Hot Pressing ...	5	5	5
Hypochlorite ...	5	5	5
Light ⅛–¼ Normal	5–6	6	6
Normal	6–7	6–7	6
2× Normal	..	7	6–7

	A	B	C
Mercerising ...	5	5	5
Peroxide Bleaching	5	5	5
Soda Boil (open kier)	4–5	5	5
Soda Boil followed by Hypochlorite ... (Combined test)	4–5	4–5	..

Tendering on exposure to light not accelerated

Fastness on Silk (B) Degumming 5, Hot pressing 5, Light 6–7, Peroxide bleaching 4–3

TEXTILE USAGE

DYEING

Cellulose On account of good level dyeing and all-round fastness as a shading colour where good light fastness is required. Suitable for curtains, hangings and for goods to be bleached, e.g. shirtings and towels

Silk For good fastness to degumming, peroxide bleaching and washing

Unions For cotton/viscose fabrics

PRINTING

Cellulose For direct print styles or as pigment with binder on cotton and viscose

Hue **Yellowish Orange**

Artificial Light: redder

Benzadone Gold Orange 3G	**YDC**
Caledon Gold Orange 3G	**ICI**
Carbanthrene Golden Orange 3G ...	**NAC**
Cibanone Golden Orange 3G	**Ciba**
Cibanone Golden Orange 3GⓅ ...	**Ciba**
Fenanthren Golden Orange 3G ...	**G**
Indanthren Golden Orange 3G ...	**FBy**
Indanthrene Golden Orange 3GA ...	**G**
Indanthrene Golden Orange 3GF ...	**G**
Indanthrene Golden Orange 3GWP ...	**G**
Ponsol Golden Orange 3G	**DuP**
Ponsol Golden Orange 3GD	**DuP**
Sandothrene Golden Orange N3G ...	**S**
Solanthrene Orange 3J	**Fran**
Tinon Chlorine Golden Orange 3G ...	**Gy**

Reactions on Cellulose

H_2SO_4 conc.— greenish blue

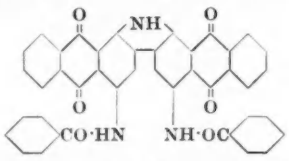
An example from the Vat dyes section of Part I is reproduced above and a specimen page (carbazole vat dyes) from the Anthraquinone section of Part II is shown opposite.

These two examples illustrate the information which appears in Parts I and II and demonstrates the dual reference system which connects the two Parts, e.g.

C.I. Vat Orange 1 in Part I and **C.I. 69025** in Part II are complementary.

The format for the dyes in Part I varies with the amount of information available. Some dyes occupy a whole page, others only part of a page. For example, the space occupied by these notes may be used to accommodate information on **C.I. Vat Orange 2.**

69005 **C.I. Vat Green 9** (*Brownish grey → Dull olive*)



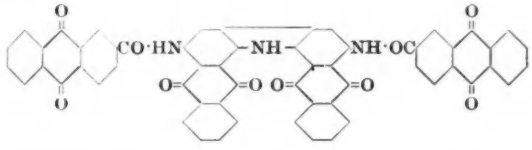
(*a*) Condense 1-benzamido-4-chloroanthraquinone with 1-amino-4-benzamidoanthraquinone in presence of copper and cyclise with chlorosulfonic acid
(*b*) Cyclise 4,4′-dibenzamido-1,1′-dianthrimide in sulfuric acid and oxidise the product

$Na_2S_2O_4$, alkaline — reddish brown; acid — yellowish brown

Discoverer — W. Mieg 1910
Bayer Co., *BP* 2702/09, 11932/09, 25986/09, 29352/10, 15753/12; *USP* 986521, 996109; *FP* 400653, 409407, 432449; *Sw.P* 55556; *GP* 220581, 225232, (*Fr.* **9**, 764, 1197), 228992, 239544, (*Fr.* **10**, 644, 638), 464292 (*Fr.* **16**, 1354)
Brit. Dye. Corp., *BP* 289191
BIOS 1493, 29; *FIAT* 1313, **2**, 135
FIAT 764 — Indanthrenoliv R
Vlies, *JSDC*, **30** (1914), 29
Fierz-David, 584 and Suppl. 82
Houben, 466, 662
Mayer, 181
Fierz-David & Blangey, Table 19
Fraser-Thomson, *JSDC*, **52** (1936), 242
Thorpe, **1**, 422

Soluble in *o*-chlorophenol
Slightly soluble in chloroform, pyridine
Insoluble in acetone, alcohol, toluene, xylene
H_2SO_4 conc. — red; on dilution — flocculent olive green ppt.

69010 **C.I. Vat Green 22** (*Olive*)

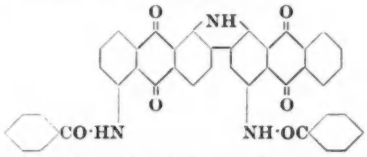


Condense 4,4′-diamino-1,1′-dianthrimide with 2 mol. 2-anthraquinonecarbonyl chloride and cyclise

Discoverer — F. Baumann 1929
I.G., *BP* 349714; *USP* 1819014; *FP* 696423; *GP* 513608 (*Fr.* **17**, 1398)
BIOS 1493, 28
FIAT 764 — Indanthrenoliv 3G

H_2SO_4 conc. — yellowish brown
$Na_2S_2O_4$, alkaline — reddish brown; acid — brownish yellow

69015 **C.I. Vat Brown 5** (*Brown*)



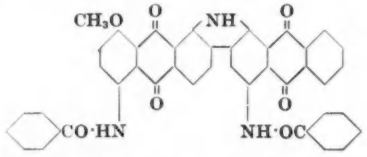
Condense 1-benzamido-5-chloroanthraquinone with 1-amino-4-benzamidoanthraquinone in presence of copper and cyclise with sulfuric acid

$Na_2S_2O_4$, alkaline — reddish brown; acid — yellowish brown

Discoverer — W. Mieg 1910
Bayer Co., *BP* 2702/09, 11932/09, 25986/09, 29138/09, 29352/10, 15753/12; *FP* 400653, 432449; *GP* 220581, 225232, (*Fr.* **9**, 764, 1197), 228992, 239544, (*Fr.* **10**, 644, 638), 491428 (*Fr.* **16**, 1349)
Brit. Dye. Corp., *BP* 289191
BIOS 1493, 10, 12; *FIAT* 1313, **2**, 106
FIAT 764 — Indanthrenbraun R, FFR
Fierz-David, 576 and Suppl. 82
Mayer, 181
Fraser-Thomson, *JSDC*, **52** (1936), 243
Thorpe, **1**, 422

Slightly soluble in xylene
H_2SO_4 conc. — dull wine red; on dilution — reddish brown flocculent ppt.

69020 **C.I. Vat Brown 36** (*Reddish brown*)

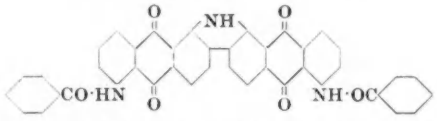


(*a*) Condense 1 - amino - 4 - benzamidoanthraquinone with 1 - benzamido-5-chloro-4-methoxyanthraquinone and cyclise
(*b*) Condense 1 - amino - 4 - benzamidoanthraquinone with 1 - benzamido-5-chloro-4-hydroxyanthraquinone, methylate the hydroxy group and cyclise with sulfuric acid

Discoverer — F. Baumann 1926
I.G., *BP* 298696; *USP* 1885172; *GP* 481362 (*Fr.* **16**, 1326)
BIOS 1493, 44
FIAT 764 — Indanthrenrotbraun 5RF
Fox, *JSDC*, **65** (1949), 513

H_2SO_4 conc. — violet; on dilution — red
$Na_2S_2O_4$, alkaline — brown; acid — brown (yellower)

69025 **C.I. Vat Orange 1** (*Yellowish orange*)



(*a*) React 5,5′-dibenzamido-1,1′-dianthrimide with sulfuric acid and oxidise
(*b*) React 1-benzamido-5-chloro-anthraquinone with 1-amino-5-benzamidoanthraquinone in the presence of nitrobenzene and cupric chloride

Discoverer — P. Fischer 1910
Bayer Co., *Sw.P* 115114
Cassella Co., *GP* 239544 (*Fr.* **10**, 638), 249000 (*Fr.* **11**, 621)
BIOS 1493, 15, 77; *FIAT* 1313, **2**, 119
FIAT 764 — Indanthrengoldorange 3G
Fierz-David Suppl. 82
Thorpe, **1**, 423

Slightly soluble in nitrobenzene, tetralin, xylene
Insoluble in alcohol
H_2SO_4 conc. — greenish blue; on dilution — orange
$Na_2S_2O_4$, alkaline — yellowish brown; acid — yellow

CONTENTS

PART I

VOLUME 1 — Foreword — Preface — Contents of Volumes 1-4 — Introduction to Part I
Acid Dyes (including the premetallised dyes) — Mordant Dyes — Basic Dyes — Disperse Dyes — Natural Dyes and Pigments — Food (Food, Drug and Cosmetic) Dyes

VOLUME 2 — Direct Dyes — Sulphur Dyes — Vat Dyes — Ingrain Dyes — Azoic Dyes (sub-divided into Coupling Components, Diazo Components and Azoic Compositions) — Oxidation Bases — Pigments (inorganic and organic) — Solvent Dyes — Fluorescent Brightening Agents — Developers — Reducing Agents

PART II

VOLUME 3 — Introduction — Nitroso — Nitro — Azo — Azoic — Stilbene — Ketonimine — Triphenylmethane — Xanthene — Acridine — Quinoline — Methine — Thiazole — Indamine — Indophenol — Azine — Oxazine — Thiazine — Sulphur — Lactone — Aminoketone — Hydroxyketone — Anthraquinone — Indigoid/Thioindigoid — Phthalocyanine — Natural — Oxidation — Inorganic Pigments — Alphabetical index of Intermediates — Empirical formula index of Intermediates

PART III

VOLUME 4 — Hue Indication Chart (in pocket) — Dye Manufacturers' Initials (in alphabetical order) and Names — Dye Manufacturers' Names (in alphabetical order) and Initials — Abbreviations used in Parts I and II — Fastness Tests etc — Patents Index — Conversion Tables relating Colour Index 1st Edition to Colour Index 2nd Edition numbers and Schultz Farbstofftabellen (7th Edition) numbers to Colour Index 2nd Edition numbers and to AATCC Prototype numbers — Commercial Names Index — Additions and Corrections

THE SOCIETY OF DYERS AND COLOURISTS
DEAN HOUSE 19 PICCADILLY
BRADFORD 1 YORKSHIRE
ENGLAND

THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS
LOWELL MASS
USA

XTILE
RISTS
MASS
USA

1956